

SOCIAL STUDIES

INTERMEDIATE GRADES



BRUNER-SMITH

THE STORY OF AGRICULTURE • THE STORY
OF FIRE • THE STORY OF THE SEA
THE STORY OF WRITING

ARCTIC OCEAN

GREENLAND

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SOCIAL STUDIES

INTERMEDIATE GRADES

BOOK ONE

BY

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PREFACE

The bewildering march of events in the last few years has brought forcefully to the attention of the people of our country the fact that we have many problems upon the solutions of which depend our security and our happiness. These solutions, if they are to be permanently helpful, must be worked out by the mass of the people. Only through realistic and vital education can this be accomplished. While much can and should be done to acquaint our entire present adult population with every element of the situation, the brightest hope for sound solutions undoubtedly lies in the education of the young. In fact, it is a major opportunity and obligation of the schools of America to see to it that the young people in their charge are far better equipped to deal with the troublesome issues which our country is facing than we adults have been. They must train our youth to cope with change — political, technological, social, economic, and aesthetic — in such fields as agriculture, transportation, housing, and feeding and clothing our people.

A sound social studies program, carefully planned and capably executed, seems to offer the best possibilities for realizing the aims stated above. Promising beginnings in this direction are appearing all over the country. School administrators and teachers have come to a sense of the ends to be achieved, and, to a degree, of the means by which they can be achieved. The chief deterrent to

success in carrying out such programs as have been set up has been the lack of materials — materials which give an adequate description and interpretation of present social conditions and possibilities; materials so simply written that pupils would begin to gain a better comprehension of some of the simple but pivotal problems of American life; materials so complete that pupils would begin to see more clearly their place in the world of change, and to appreciate more keenly the experiences through which men have learned and are still learning to work and play together; materials sufficiently vivid and dramatic to captivate the interests of pupils and move them to active, constructive participation in rich group living appropriate to their age, abilities, and experiences.

The authors of these books are attempting to supply such material. The program presented in the series is based upon the theses: first, that a civilization to have virility must be thoroughly rooted in the culture of its own time; second, that a rich culture fraught with opportunities and difficulties now exists; third, that the curriculum of the American schools, especially in the field of the social studies, should capitalize upon the wealth of opportunities which today's culture presents; fourth, that pupils must be acquainted with the errors and successes of peoples of other times and other climes in order to gain proper perspective in viewing our problems of today; and fifth, that, in the light of their study of present and past conditions, pupils must learn to go forward looking forward.

Certain controlling themes have influenced the selection and presentation of the program of this series. These themes are as follows: (1) Man's Increasing Control

over Nature; (2) Man's Tendency to Move from Place to Place in Quest of a Higher Standard of Living; (3) The Increasing Interdependence of Peoples; (4) The Necessity of Man's Adaptation to Meet the Requirements of Subsistence, the Pressure of Competing Groups, and the Conditions Implicit in Change; (5) The Progress of Democracy.

Considerations of the nature of those raised above point the way to a program in social studies that is a decided departure from the courses in history and geography that have been the established custom in most school centers up to the present. They demand, furthermore, a program that is not a mere fusion of the established history and geography courses. A program that is the outcome of such considerations must be one in which fundamental understandings take precedence over fact as fact, which stresses change and development rather than exact, detailed pictures of any certain area or areas in time or place, which seeks to make pupils conscious of the story of human development as a story of the struggle of individuals or of groups with forces or factors in their environment, and which reveals to pupils that the present lies in the stream of that development and of that struggle, and that the future is dependent upon the part they themselves take in that struggle.

With these aims in mind, the authors have sought, in these intermediate grade books, to help the pupils to open up for themselves eleven significant aspects of living. In Book One will be found a systematic presentation of four of these aspects: *The Story of Agriculture*, man's conquest of hunger, one of his most unusual industrial achievements; *The Story of Fire*, one of man's most important

scientific achievements; *The Story of the Sea*, a major achievement of man in the field of commerce; and *The Story of Writing*, one of man's greatest intellectual accomplishments. By vivid presentation through story and picture, pupils are led to feel the tremendous sweep of progress in each of these major areas of man's achievement. In connection with each section or subsection of a unit, suggested activities augment the text in developing understandings, appreciations, and attitudes and guarantee the connection between the pupils and their environment and the great forces of world development.

THE AUTHORS

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UNIT I

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I. FARMING IN AMERICA

We have many kinds of farms in America. Some of these farms are small. The farmer does his work with simple tools and with the help of horses and mules. But there are large farms, too. On these the farmer does his work with machines. If you were to visit one of these large farms, what would you see?

JACK'S FACTORY FARM

"Hello, there, Jim!" called Dick, as Jim got out of the car.

Jim came slowly up the steps where his school-mates were waiting for the school doors to open.

"Was that your father?" Dick asked.

"Yes, my father is a doctor," said Jim. "He had to go to the country early this morning, and he took me with him. I'm going to be a doctor, too, when I'm grown. It's the best work there is!"

"I'm going to be a business man and make lots of money." Dick spoke quickly. "My father is a business man. He's going to take me into the store as his partner as soon as I finish high school."

"My father is a bigger business man than your father is," boasted George. "He owns a factory

that makes rope and cord. He sells rope all over the United States. I think it's very important to make things people use. I'm going to own a factory when I'm grown."

"My father owns a factory, too," said Jack. "I'm going to be his partner when I have finished college."

"A factory!" exclaimed David. "Tell us another one! Your father is a farmer, and you know it. What do you mean?"

"My father says he has one of the biggest factories in this part of the country," declared Jack. "He doesn't make things for people to use; he makes things for people to eat. He has a factory farm. It's a food factory."

The bell rang, and the boys walked slowly into the classroom. They wondered among themselves at the idea of Jack's food factory.

"Mr. Arnold," said George, "Jack's father is a farmer, but Jack says his father has a factory. Why does he say he has a factory when it isn't true?"

"How about it, Jack?" inquired Mr. Arnold.

"My father says he has a food factory," Jack answered stoutly. "He furnishes food for lots of people. If you want to, come on out and see for yourselves. We'll be glad to show you around."

"How many of you would like to go?" asked Mr. Arnold.

"I would!" each child called.

"All right, Jack," said Mr. Arnold, "we will visit this factory. Find out when your father can see us, and we will come then."

So it was planned that Jack's class should visit his father's food factory.

The following Saturday a large truck carried the boys and girls to the farm. As the truck rolled through the big gate leading into the yard, the children looked around curiously.

"So this is the factory, is it, Jack?" said Mr. Arnold.

"Where are the machines?" teased Dick. "Where are the workmen? If this is a factory, we should see smokestacks and machinery and engines."

"You will see the machines all right, and workmen, too," was Jack's answer. "You won't see smokestacks, though. We use gasoline engines to run our machines. We have our machines on wheels, too, so that they don't have to stay in one building. This is an outdoor factory."

The children looked about with keen interest as they jumped down from the truck. Some of them had never been on a farm before and did not know what

to expect. None of them had seen such a farm as this one.

Buildings stood all about them — big buildings and little buildings. They were painted white with green trimmings. Cement walks led to each one of them. Could all these buildings belong to only one farm?

"It looks like a village," said David.

The children wondered what the different buildings were used for.

"Dad and I want to show you around," said Jack, as his father came from one of the buildings.

Mr. Anderson gave everyone a warm welcome. "We understand you wish to see our food factory, as we call it," he said. "We shall be glad to show it to you and to tell you anything you want to know. Perhaps you think of this as a farm. Well, it is; but it is more than a farm. It is a factory, too, for we do nearly all of our work with machines. We turn out our food products in great quantities. We have to handle and ship and sell our products in great quantities, just as a factory does. That is why we call it a factory farm."

Mr. Anderson and Jack led their visitors from one building to another. First they came to a big office where many people were busy at typewriters,

desks, adding machines, and filing cases. Here the business of the great factory farm was cared for.

Next they saw a dairy barn with stalls for many cows. The stalls were lined with shining tiles, like the walls of the boys' bathrooms at home. The stalls were as clean as bathrooms, too. Beside the barn were silos, where some of the winter's food supply for the cattle was stored.

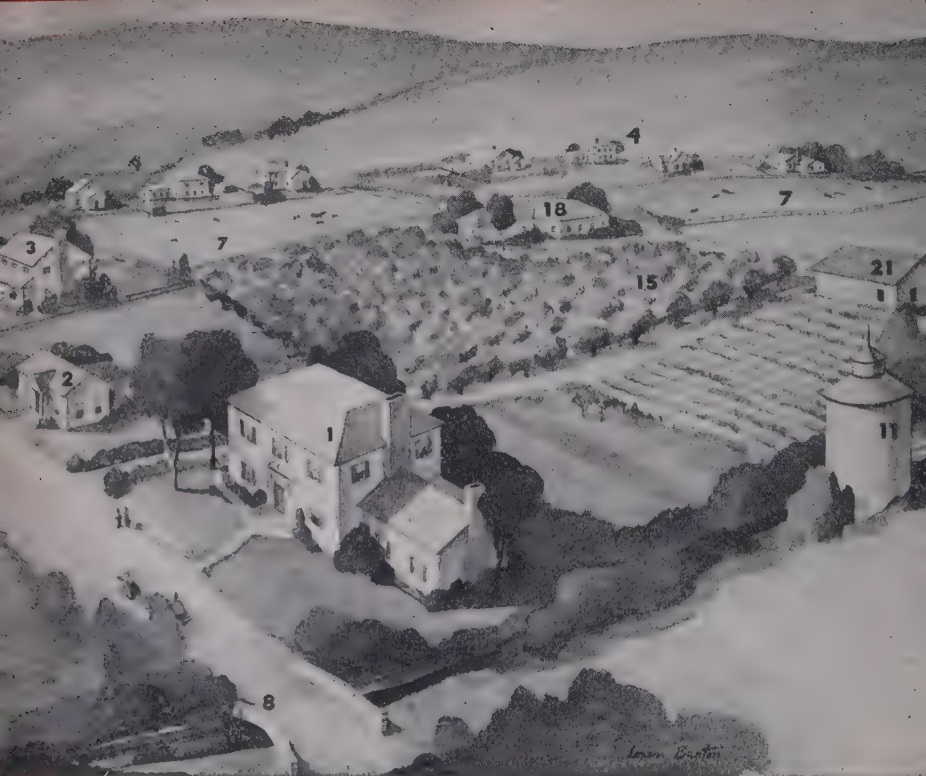
In another building near by were many machines for cleaning milk bottles and pails, a machine for filling bottles, a cream separator, and great ice boxes for storing the bottled milk.

Farther away were the pig shelters with many little rooms — one for each mother pig and her family. Clean straw was on the floor of each little room.

In another place the children saw hen houses with their yards.

"Now we want to show you how we prepare the soil before we put in the seed," said Mr. Anderson. "The fields where the men are working are a long distance from here. We will go to the fields in the truck."

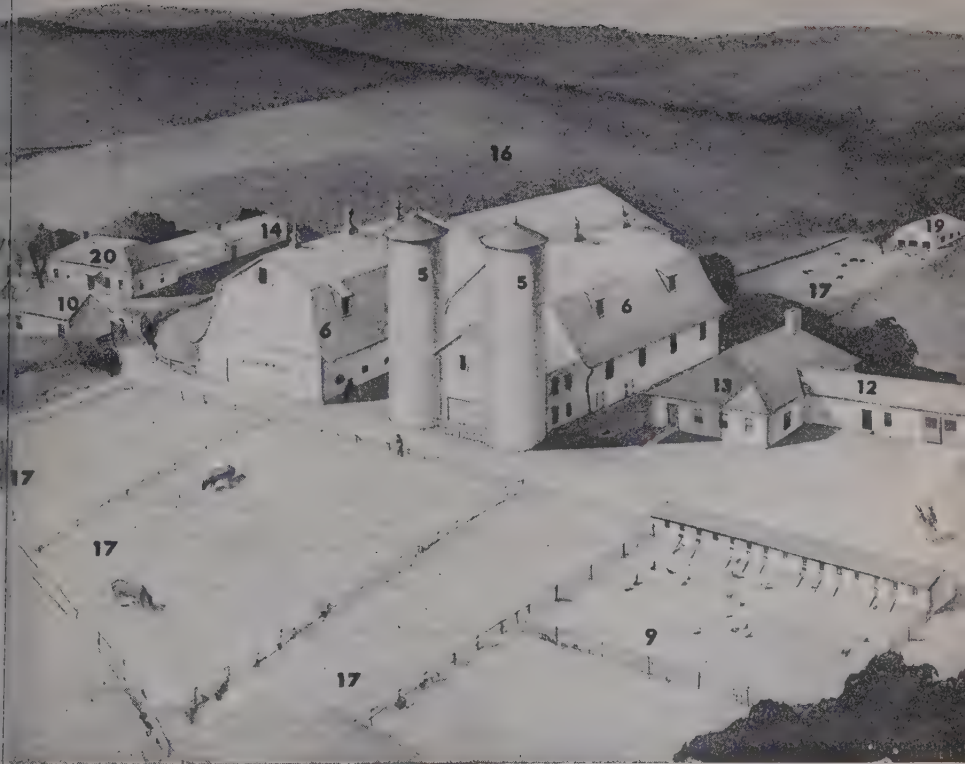
The children climbed into the truck once more, and away they went to the fields. They were too busy looking around to talk, for at each turn they saw new things they had never seen before.



MR. ANDERSON'S FARM

The picture on this page and the page opposite shows Mr. Anderson's factory farm. Find the numbered parts in the picture which match the names given in the list below and on the page opposite :

- | | |
|------------------------------|---------------------|
| 1. The house of Mr. Anderson | 6. The barns |
| 2. Mr. Anderson's office | 7. The pasture |
| 3. The house of the manager | 8. The brook |
| 4. The houses of the workers | 9. The chicken yard |
| 5. The silos | 10. The ice plant |



- | | |
|--------------------|----------------------------------|
| 11. The granary | 17. Animal lots |
| 12. The tool house | 18. The clubhouse
for workers |
| 13. The foundry | 19. Pig shelter |
| 14. The greenhouse | 20. The laboratory |
| 15. The orchard | 21. The garage |
| 16. Fields | |

Talk over each place named in the list. Why is it needed on a large farm like this one? Does the picture help you to see why many workers and many machines are needed on a "factory farm"?

MACHINES ON THE FACTORY FARM

"First we'll see what Mike is doing," Mr. Anderson told his visitors. "Mike is one of our best workers. We want you to see how fast he can turn up the earth-worms."

They went to a field that was being plowed. The boys and girls left the truck and leaned against a wire fence while they watched for Mike. They could see him coming down the field toward them.

Mike sat high up on the seat of a large tractor. He was steering with a wheel much like the wheel of an automobile. He waved one hand at the children as he brought his tractor to the end of the field. Then he shifted the gears, gave the wheel a twist, and turned the tractor around with a flourish that made everyone laugh.

The machine Mike was driving looked like a huge caterpillar crawling across the field. And that is what it was called — a *caterpillar tractor*. It moved like a giant worm squirming along over the land. The wheels were wide, so that they would not sink into the soft ground. A flat, notched chain belt was stretched around the two wheels on each side of the tractor. The chain belt bit into the earth and helped the heavy machine to go easily over rough places in the field.

A plow was hitched to the tractor. Such a plow it was! Really there were four plows, all fastened in a row. The shiny, sharp edges of each plow cut down into the black soil and turned the dirt over in four deep, even furrows.

"Well, what do you think of my four-bottom plow?" asked Mr. Anderson. "Long years ago, when men first learned to plow, they could not make deep, even furrows like these. They made crooked furrows hardly deep enough to bury an earthworm. It would take about one hundred forty men to do as much work in a day with one of those old wooden plows as Mike will do today."

"One hundred forty men!" exclaimed Jim. "Whew! I should say Mike is a good worker!"

"Yes, Mike is a good worker," Mr. Anderson replied as he watched the tractor pulling the four-bottom plow. "But we have given him a good helper, too. That tractor can do many more things than draw a plow. We use it for pulling the disks or harrows that make the soil fine. We use it for rolling the land to make it smooth before planting the seed. We use it for seeding, for mowing, for raking, and for loading hay. We use it for harvesting our grain. We use it for moving stones and pulling up stumps when we are clearing new land. We use it for hauling grain



Philip D. Gendreau and Caterpillar Tractor Company

THE TRACTOR AT WORK

to the elevator. We use it for cleaning out ditches or digging new ones. We use it for stretching fence wire when we are making new fences. We are always finding new uses for our tractor. But come and see my best machine."

Mr. Anderson and Jack took the children to the tool house. There Mr. Anderson showed them the machine he was most proud of — the *combine*.

"This combine," said Mr. Anderson, "has been nicknamed 'The Straw Giant.' It cuts down the wheat stalks and threshes out the kernels of grain. It winnows the grain; that is, it blows out the chaff. Then it sacks the grain, ready to be hauled to the storehouse, or elevator, where the grain is stored for shipping. It does these things fast, too — faster than a dozen men can do them. The straw, or dried wheat stalks, is left in the field to be plowed under for fertilizer."

Before the children left Mr. Anderson's farm, they had seen many kinds of machines. Some of these were general machines, like the tractor, used for different kinds of work. Some of them were special machines, used for only one kind of work. The plow, the seeder, and the cultivator are special machines. All of these machines are able to take the place of many men.

The children had also seen people doing many kinds of work. Some were gardeners, caring for the shrubbery, the trees, and the grass. Some cared for the animals. Others, who were trained in science, worked all day trying to find better ways of feeding the animals, of choosing seeds, or of making the land more fertile. Carpenters were building new buildings or making repairs. Young women were busy in the office, ordering supplies.

The greatest number of men were busy with machines. Some were driving machines as Mike was. Others were oiling, repairing, and cleaning machines.

"How large is this farm?" asked Dick.

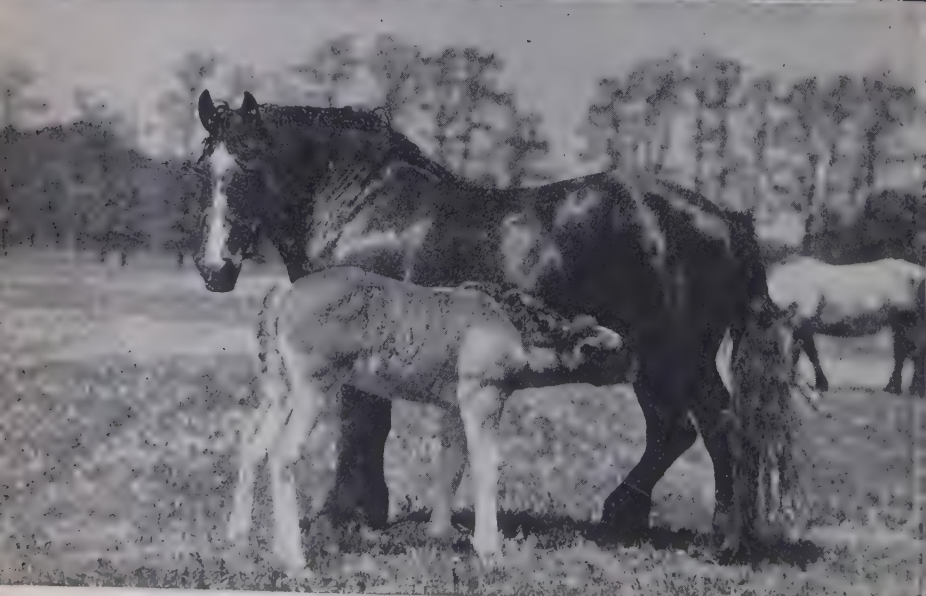
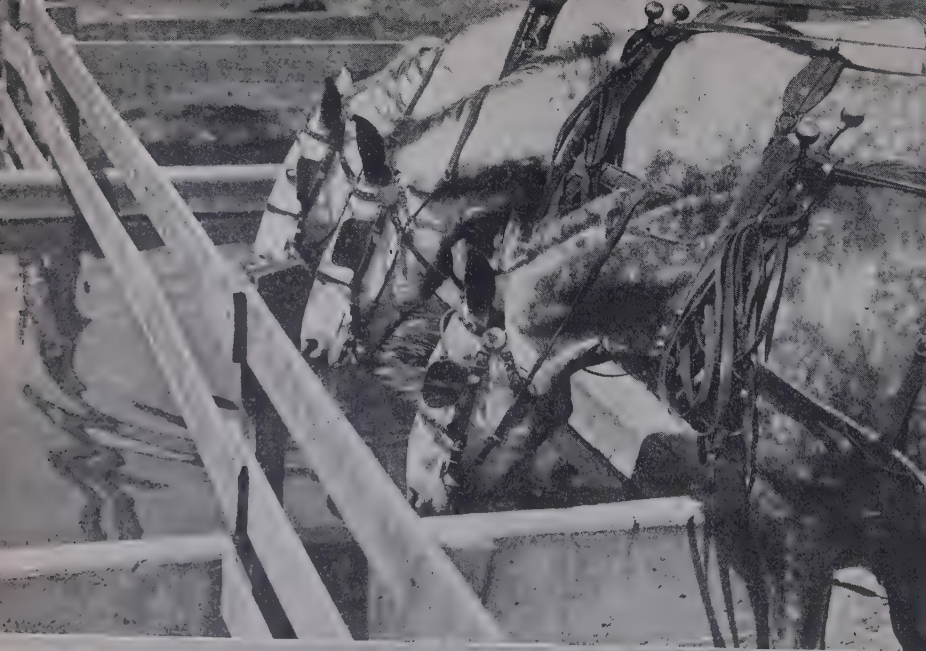
"There are twenty thousand acres in it," Mr. Anderson answered. "This farm would make one hundred twenty-five farms of the size of my first one. For many years I lived on a little hillside farm of only one hundred sixty acres. We had to work hard to make a living. It was my home, and I loved it. But there was not much food left to sell after we had saved what we needed to eat for ourselves. Will you go to my office and get the pictures of our old farm, Jack? Perhaps the boys and girls would like to see them."

The pictures which Mr. Anderson showed the children are on the next four pages.



THE FARMER'S HOME, MOUNTAIN DISTRICT

"This is the way my first farm looked. It was a hard farm to cultivate. The fields were small and billy. Hand tools and a few small machines drawn by horses were all we had to use in those days. We couldn't own very many acres because we couldn't care for them."



"Horses were important helpers in my farm work."

J. C. Allen and Son



J. C. Allen and Son

"Everyone in the family helped with the chores."



Philip D. Gendreau and Brown Brothers

"In the old days I plodded over every foot of ground in my fields at plowing and haying time. I walked the furrows until my legs ached. My pitchfork went down and up, down and up until my arms and back were tired out."

"Do you see why we are glad to have such a farm as our new one?" said Mr. Anderson as he put the pictures back into their envelope. "On a factory farm, we can help raise enough food for all the people in the United States. We can use machines — big machines — many kinds of machines — and raise plenty of food. Food should be cheap enough for everyone to buy, and there should be plenty of it — all we can eat."

By the time the children were ready to go home they had decided that Jack was right in calling his father's farm a food factory.

"It surely is a food factory," said George. "I never saw so much farm machinery in my life. Your farm carries on as much business as my father's rope factory."

"Yes, and as Jack said, it's a factory on wheels," said Dick, "for the machines travel about wherever they are needed. No wonder you call it a factory farm."

Visiting a Farm. Would you like to visit a farm, as Jack's class did? Find out about the different kinds of farms that are near you. You may find that there are farms that raise only grain; or farms that supply only milk, cream, and butter; or farms that supply only eggs and chickens; or farms that produce only vegetables and fruit. Make plans to visit one of the farms. Before you

go, make a list of questions for which you wish to find answers. Be sure to include these questions in your list :

1. How large is the farm?
2. What kinds of foods does the farmer raise? Where does he sell them?
3. What kinds of farm animals does he keep?
4. What kinds of tools and machines does he use? Where does he buy them?
5. What kinds of buildings does he have?
6. Is the farmhouse different from your home? How?
7. Is the farm different from Mr. Anderson's farm? How?

When you return from the trip, talk over the answers to these questions.

Telling What You Saw. I. Make a picture map of the farm you visited. Take a large sheet of paper and spread it out on the floor. On the paper draw or paint pictures to show the farm buildings, the fields, and some of the machines and animals.

II. Make a booklet called "Our Trip to a Farm." You could write stories and draw pictures for the booklet. Your stories could have such titles as these :

1. The Ride to the Farm.
2. How the Farmer and His Family Live.
3. The Food the Farmer Produces.
4. The Farmer's Helpers — His Workers, His Animals, and His Machines.
5. How the Farmer Sends His Food to Market.

II. GETTING FOOD IN THE DAYS OF LONG AGO

People have not always known how to raise food as we do today. Long, long ago, in the early days of mankind, there were no farms and no farmers. And yet people must have had food. How did they get their food in those early days?

THE FOOD-GATHERERS

Long, long ago, when men first began to live upon the earth, things were quite different from what they are today. The earth itself was different then, too. The animals were different. Even men were different. We call these early men primitive men. The word *primitive* means "first."

No one knows exactly how primitive men lived. They left no books to tell us. People did not make books in those days. They did not even know how to read and write. That is why we have no easy way of finding out the things we wish to know about those early times.

But we have been able to find out a great deal about those times even without books.

We have found some of the caves where primitive people lived. In the caves were tools and weapons which the people used. There were bones of wild animals and even bones of the people. In some of the caves there were pictures carved or painted on the walls. These caves and the things in them have told us much about how primitive people used to live.

In some parts of the earth there are still savage people living. They live much as the early people lived. By watching the savages of today, we can learn a great many things about the way primitive men lived long, long ago.

How did the primitive people get their food? Perhaps you have seen birds feeding. There they go, pecking away, here a worm, there a bug, and next a tiny seed. How busy they are! Their heads bob up and down, as they reach for this and for that. When they are hungry, they feed upon whatever is at hand. They do not have meals, as we do. They eat all day long, whenever they find food.

The birds do not prepare their food. They swallow it just as they find it. They do not put away any of the food for the next day. They expect to find worms tomorrow, as they found them today. Birds are food-gatherers. They eat whatever food they find. If there is nothing to be found, they starve.

In the early days people got their food as the birds do. They ate the wild things growing on the plains and in the woods. All day long they wandered about over fields and mountains, through the woods, and along the banks of rivers. If they were hungry, they gathered things to eat as they walked along. If they were not hungry, they left the food untouched. We call these very early people food-gatherers.

You may think that the food-gatherers of early times ate queer food. Much of it was different from the food we eat. Sometimes they fed upon grasshoppers. Sometimes they feasted upon wild strawberries. Sometimes they found caterpillars — enough for a good dinner! Sometimes their bright eyes discovered nests of birds' eggs.

They found nuts in the forests. They found wild fruits, grasses, seeds, plants, and roots. They ate moss and leaves. They ate buds of trees and even tender bark and twigs. Probably some of their foods were much like our carrots, onions, rice, and wheat. They ate locusts and beetles and crickets. They ate small birds and fish and snails and eels and snakes. They ate turtles and crabs. They gathered seaweed along the ocean shores and water cress from small streams.

The food-gatherers were not in the least particular about their food. They ate anything they could find. They did not care whether it was fresh or spoiled. They did not care whether it was ripe or green. They nibbled away at anything. If it did not taste good, they would throw it away and go on to hunt for something else.

They did not prepare their food. Probably they never thought of washing or cooking what they found. They were satisfied with the food as they found it. They knew of no way of making it better.

Food was not always easy to find. During the summer there was usually plenty of food. There were enough plants, insects, and small animals for everyone. But when winter came, it was hard to get enough food. The early people lived in the forests with the animals. These wild beasts often ate up everything there was. Bears ate the honey and berries. Wild hogs ate the roots and tender sprouts. Squirrels ate the nuts. Cattle, goats, sheep, and deer ate the grass and tender plants. Birds ate the seeds and fruit. The fierce beasts ate the smaller animals. What was there for men to live on?

Perhaps you wonder why the food-gatherers did not kill the larger beasts for food. They could not.

They had no weapons. They could catch the little fellows with their hands. They might even try to kill the larger ones that were slow or weak or stupid. But not the fierce beasts! Men let them alone! The men were afraid and hid from those beasts, or ran away when they saw them coming.

If the food-gatherers had known how to put away nuts and seeds during the summer, they would not have starved during the winter. If they had known how to dry fruits and to bury roots and plants in the warm earth, they could have saved the food for the months when plants could not grow. But they did not know these things. When they had plenty, they feasted. When food was scarce, they starved.

For thousands and thousands of years primitive men were food-gatherers.

The Early People. I. Primitive people probably looked different from the people you know. Find the pictures in this book which show you how the primitive people may have looked. Can you find pictures of primitive people in other books? Study the pictures. Tell some ways in which the early people looked different from your friends.

II. Perhaps you could write a story or a poem or draw a picture about the way primitive people lived. Tell or show what you know about their cave homes, about their ways of dressing, and about their ways of getting food.

Foods of Today and Long Ago. I. List some of the foods which you eat but which you are quite sure the early food-gatherers did not eat. Be ready to give a good reason why you have placed each food on your list.

II. Someone spends several hours each day getting food ready for your family to eat. What are some of the things she does which you are quite sure the food-gatherers did not do? Make a list of them. Be ready to tell why you placed each thing on your list.

Better Ways of Getting Food. The next two stories are going to tell you how primitive people found better ways of getting food. But before they could change their ways of living, they had to learn new things. Perhaps you can guess some of these new things. Try it. Think of two or three things which you are sure they had to learn before they could have better food. Make a list of the things on your paper. Save your list. When you have finished reading the next two stories, look back at your list. Then you can tell how well you guessed.

THE FOOD-GATHERERS BECOME FOOD-HUNTERS

After many years primitive men learned a new way of getting their food. They began to like some foods better than others. So they were no longer satisfied to take what they found in their paths. They wanted better food, and they were willing to hunt for it. They were food-gatherers no longer; they became food-hunters.

You must not think that these people hunted as men do today. You may have seen your father or an uncle getting ready to go on a hunting trip. He cleans his gun. He looks over his case of shells. He dresses in his leather trousers, his buckskin coat, and his high boots. He finds his old hat and hunting bag. Then he is ready to start. He is going hunting because he enjoys it. If he gets some ducks or rabbits or a deer, he will be pleased. If he doesn't, it will not matter, for he will not go hungry. Hunting is just sport for him.

How did primitive people ever learn to kill the wild beasts? The primitive men lived as savages, to be sure. They were strong and cruel, and almost like the beasts. Yet they were not suited to live a wild life, as the animals were. Their flesh was tender and easily hurt. They had short, thick legs that were not made for swift running and leaping, as the legs of the deer are. They did not have sharp claws, or heavy hoofs, or long horns and tusks, or long sharp teeth. They could not fight the wild beasts face to face. They could only run and hide from them.

But these primitive people had three things that wild beasts did not have. They had minds that could think and plan, and could help them to learn how to do things. They had nimble fingers and thumbs

that could grasp objects and hold them. They had throats that could say words. These were wonderful gifts to men — more wonderful than all the horns, hoofs, long sharp teeth, and strong paws in the world. With these three gifts men have made themselves masters of the beasts of the forests.

But many long years passed before primitive men learned to use their heads and their hands to make themselves masters of the forests and the beasts. Slowly the men began to think better. They began to invent ways of doing things and to tell one another what they had learned. One of the first problems they had to think about was this problem of catching and killing the animals. How could men make themselves more powerful than the beasts which had sharp tusks, horns, or teeth? What weapons could men make that would be a match for the sharp natural weapons of the fierce wild beasts?

At first, men used the stones they found lying about. They rolled large stones down from the cliffs and crushed the animals below. They threw smaller stones at the beasts which came near enough. They learned that stones would kill faster if they were sharp. Then they looked for sharp stones to use. In the picture on the opposite page, you can see primitive men using their first weapons.



Courtesy American Museum of Natural History

MAN'S FIRST WEAPONS

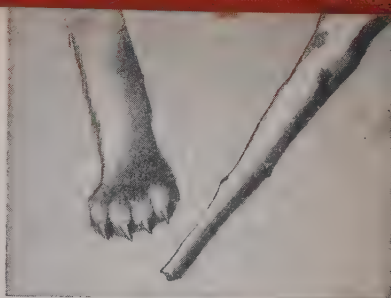
Perhaps stones were the first weapons. Early man could stand high above the cave bears and roll stones down upon them

Men also learned to use sticks as clubs. At first, the men used the sticks just as they found them lying on the ground. Then, little by little, they learned how to find and make better clubs. They made them from long, straight limbs of trees, so as to give themselves a long reach. They chose limbs that were big and knotty at one end and small at the other end. The small end made a good handle. Clubs helped the men to master the wild beasts.

Later the hunters made spears from long wooden poles. Sometimes they pointed one end of each pole by burning it in the fire. Sometimes they fastened a sharp stone to one end of the pole. With such spears men could fight as the wild goats fought with their horns. They could fight as the wild hogs fought with their tusks. Yet they could stay out of reach of the horns and tusks. Clubs and stones and spears gave men a longer reach. They could fight the beasts without getting close to their strong paws or long tusks.

The hunters also learned to make stone axes and knives. They found flat stones and made them smooth and sharp by rubbing them against other stones. They fastened the flat stones to wooden handles. Then they had weapons to take the place

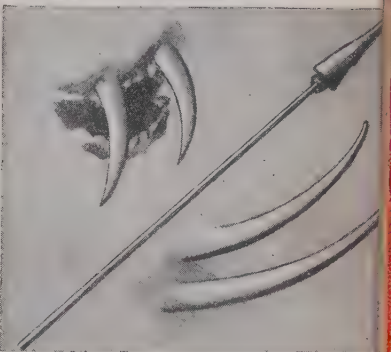
Man's weapon for fighting against animals with powerful paws was the club. After man had learned to use the club, strong paws were no longer fearful to him.



Man's weapon for fighting against sharp claws was the knife. The knife took away man's fear of tearing claws.



Man made the spear to help him fight animals with piercing horns and tusks.



An arrow shot from a bow can fly faster than any animal with swift slender legs. The bow and arrow helped man to overcome the speed of animals.



of the sharp teeth and pointed claws of the animals. With these weapons men could scratch as wild cats scratched, or tear flesh as the teeth of wolves tore flesh.

The legs of the hunters could not carry them fast enough to catch up with the wild beasts. Of course men could not make longer or swifter legs for themselves. But they could make bows and arrows. An arrow shot from a bow could catch up with the swiftest animal that ran. With bows and arrows to help them, the hunters did not need to follow the deer. They could send arrows after the animals and kill them.

Weapons were a great help to the primitive people. With weapons men could scratch and tear and crush and pierce the flesh of their enemies. Weapons gave primitive men new power over beasts. Now primitive men could fight like beasts. They could fight even better than beasts because they could think and plan. They became masters of the forest. What a step forward that was!

The weapons of primitive men were *crude*; that means they were roughly made by hand out of bones and stone and wood. The early men had few tools to make weapons with — only other stones, pieces of wood, fire, and their bare hands. They had no other

weapons to copy. At first, they had not even seen other weapons. Yet they were able to make the axes, spears, clubs, arrowheads, and knives that helped them conquer the wild beasts.

What a victory! The people became brave and daring. They no longer ran away or hid when they saw mountain lions and grizzly bears. They no longer had to eat whatever they could pick up. They could hunt the animals whose flesh they liked to eat. They had food — great quantities of food. It was fresh. It was good to eat.

Perhaps you are thinking that the animals were luckier than the primitive men were because the animals were born with their weapons all ready for use. But there are two important points to remember about animals.

The animals have never been able to improve their weapons, as men have. The animals' weapons are exactly the same today as they were thousands of years ago.

Besides, the animals can never lay aside their weapons. The weapons are parts of their bodies and must be carried around all the time. They need to use their weapons still to get food. Men do not often need weapons today. Men can lay aside their weapons when they are not needed.



A GROUP OF PRIMITIVE PEOPLE

The picture on this page and the opposite one tells a good many things about primitive people. See whether you can read facts from a picture. How many different weapons do you see? Which ones might have been used to kill the deer?



*Painted by Charles R. Knight under the direction of Henry Fairfield Osborn.
Copyright by the American Museum of Natural History*

After man had lost his fear of animals, the animals served man in many ways. Several ways are shown in the picture. Can you tell what three of them are? The picture shows you that man had learned to make other things besides weapons. What were some of them?

After men had learned to make weapons, their whole way of living changed. They no longer spent their days merely wandering around gathering food. They had other work to do. Part of their time was spent in hunting animals and wild plants or in fishing. Part of it was spent in making weapons. Part of it was spent in play and in rest.

The food-hunters probably worked harder than the food-gatherers, but they lived better. The people were more comfortable. They were safer. They had more time to learn about other things.

Facts about the Food-Hunters. On this page and the next are ten statements about food-hunters. Each statement is divided into two parts. The *beginning* of each statement is in List I, and the *ending* of the statement is in List II.

Take a piece of paper. Put down the number 1, and after it write the beginning of statement 1. Think of how the statement ought to end. Then look in List II for the right ending to the statement. When you have found the ending, finish the statement on your paper. Then do the same with each of the other statements.

LIST I. BEGINNINGS

1. Primitive people became food-hunters after they
2. Primitive weapons were
3. Clubs and stones took the place of

4. Spears took the place of
5. Bows and arrows took the place of
6. Knives and axes took the place of
7. Men became more daring when they had
8. Men could fight better than animals because men
9. Men had three things animals did not have :
10. Weapons helped men to become

LIST II. ENDINGS

- (a) made of sticks and stones.
- (b) the swift legs of the animals.
- (c) learned to hunt for special foods.
- (d) the teeth and claws of the animals.
- (e) the strong paws of the animals.
- (f) the masters of the forest.
- (g) could think and plan.
- (h) weapons with which to fight.
- (i) the tusks and horns of the animals.
- (j) fingers that could grasp, throats that could talk,
and minds that could think and plan.

HUNTERS MAKE THEIR FOOD BETTER

Perhaps you would not have enjoyed some of the foods of the food-gatherers or the food-hunters. You may wonder how they could have eaten a dinner of raw meat or fish, or a breakfast of bark or seaweed. These foods seem strange to you because you do not eat them.

People today choose food because it is healthful or because it tastes good. The early people did not choose at all. They ate whatever they could find. They had not learned that some foods were better for them than others. Perhaps at first they did not even remember which foods tasted good.

Little by little, they learned that some foods gave them more pleasure than others. Perhaps they even noticed that some foods satisfied their hunger better than others. At first, they probably ate any berry they could find. Later, they chose only ripe berries, leaving the others on the bushes. Still later, they began to remember where they had found certain large, sweet, juicy berries. They remembered that they had enjoyed these berries and wanted more of them. Each year, when it was time for these berries to ripen, the people probably returned to that same place to pick them.

Mothers, too, may have warned the children about different foods. "Pick only the berries that are purple," they probably told the children. "The purple ones will be sweet and juicy. Do not take the green ones. They are sour. They will make your stomach hurt."

As primitive men became more particular about their foods, they learned how to prepare them.

They tried to make them taste better. They wanted to enjoy their food.

Slowly they learned how to grind up the hard seeds and grains, so that they could eat them more easily. They found they could use two flat stones for grinding. If the stones fitted together well, the grains became fine flour. They could use this ground-up grain to make porridge or bread. You can see primitive people grinding grain in the lower picture opposite page 42.

They learned that fish tasted better when it was wrapped in mud and baked in the hot ashes. They learned that meat was more delicious when the animal was skinned before it was cooked. They learned various ways of cooking foods.

Most of our food today is prepared in factories. We do not have to grind grain, skin our animals, or even bake our bread or cake. We can have all of these things done for us.

Primitive women spent hours and hours each day grinding their foods, mixing them, and cooking them. They even had to make their own pots and bowls from clay. They learned to cook by trying first one way and then another. They learned to mix foods by putting different kinds together and eating them. If the mixture tasted good, they put the same kinds together again and again.

People in the days of the food-hunters did not have the good things to eat that we have now. But they had much better food than the food-gatherers had. Their food looked better and tasted better. It was better for them. The women were doing their part in making their families live more comfortably.

The days of summer and autumn were feast days for the primitive people. There was plenty of food. The people ate all they could — sometimes more than was good for them. But they could not eat all that they could find. Much food went to waste.

In the winter food was hard to find. Plants could not grow. Berries and nuts could not be found. The animals became lean and fierce and were hard to kill. Then the people often starved.

The women were troubled over this problem. They worried when they heard their children cry for food. They worried when they had to tramp through the snow and ice to find a few roots or plants for their families. They worried more when they had to return at night with no food.

The women, like the men, had hands that could work with skill. They had minds that could think and plan. They learned that some foods could be saved. They learned to gather the ripe grain. They learned to dig roots from the ground, to dry the nuts

and berries, to save the seeds. They learned something else, too — to hide some of these foods from their families and to save them for the winter.

Where could the women hide their dried berries? How could they keep the grain dry? What could they put their seeds in? They needed *containers* to store their food in — jars or bowls or baskets.

The first containers were probably gourds or the skulls of dead animals. In these the women placed the precious grain, nuts, seeds, or roots. Then they hid the containers away from all eyes.

Later, women learned to make baskets from leaves or grasses. These baskets were very crude at first. But the women kept on trying until they learned to make better ones. Sometimes they made baskets as large as barrels.

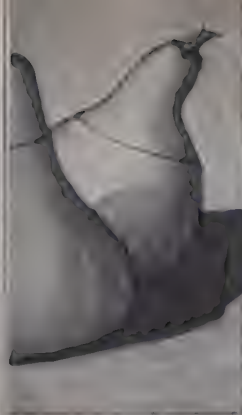
Often the containers were nothing more than holes in the ground. The women lined the holes with leaves or with skins. After they had filled the holes with food, they covered them with dirt. The food was well hidden. It was safe until it was needed during the winter.

In such ways the women learned to save food for winter. It probably took thousands of years to learn how to do this. But what a difference it made in the comfort and safety of the people!

People have never forgotten the lessons which these primitive women learned. Ever since those times people have gone on storing food and saving it for times when food is scarce. The wives of the food-hunters invented the first containers. Some of these primitive food containers are shown in the upper picture on the opposite page. Ever since, people have gone on inventing better ones. Today we have the best containers people have ever had. We have bottles, glass jars, tin cans, jugs, paper and cloth sacks, cartons, boxes, buckets, baskets, tubs, and barrels. We have cupboards, pantries, cellars, and refrigerators. We have silos for storing food for cattle; and we have grain elevators, granaries, and storehouses. There is no end to the sizes, the shapes, and the uses of containers today.

Today we have cold-storage places, too. Foods may be frozen and kept for months. We have canning factories, where food is put into glass jars or tin cans and then sealed, so that the food cannot spoil. We have warehouses, where great quantities of food may be kept safe from moisture, from pests like insects or rats, or from dirt. All of these places are used to keep food for later use.

And yet we are not so saving of our food as the women of early times were. We waste much food



SOME PRIMITIVE FOOD CONTAINERS



PRIMITIVE PEOPLE GRINDING GRAIN

each year. We let mice and rats and insect pests eat some of it. Farmers are careless about this. Housewives are careless about this. Many of us have so much food that it does not seem precious to us.

In the early days, after women had learned to store food, they had to work harder than ever. They had to make containers. They had to keep them filled. They had to guard them. But the women were much happier than they had been before, for they were safer from starvation and their families were more comfortable. Learning to save food and to keep it fresh for later use was an important step in improving the ways of living.

Trying Out Primitive Ways. I. Have you ever tried chewing raw wheat? If you have, you know that it takes a long time to chew a whole mouthful of it. Before it is fine enough to swallow, your jaws become tired and your mouth becomes sticky. It certainly is hard to chew grain. But, at one time, the primitive people knew no better way of preparing grain than by chewing it. How do you think they may have learned a better way of grinding the wheat into flour? Perhaps you can make a good story of this discovery and tell it to your classmates.

II. Get some wheat and grind it into flour by using two stones, as the primitive people did. After you have finished, ask yourself these questions: Was it hard to find

the right kinds of stones? How long did it take to grind a cupful of flour? Was it easy work or hard work? Was the flour you made fine or coarse? Be ready to tell the class what you found out.

Preparing Foods. I. Make a list of the foods which you like to eat raw. Make a list of some which you like better when cooked.

II. Mention two things which your mother does to make your food taste better. What are some of the things which she does to make the food look better? Why does she try to make it look attractive? What are some of the things which she does to make it digest better?

Containers of Primitive Days. I. Make or collect pictures showing the kinds of containers used by primitive people. Make or find a picture of the largest food container you have ever seen; the smallest one.

II. Can you learn how to make baskets and pottery jars and bowls? Try making food containers the way the women did in primitive days. Making them will help you understand what hard work the women did in those days.

Containers of Today. Start a collection of pictures of food containers used today. You will be surprised at the number of these you will find. Who in the class can find the greatest number of pictures? Who can find the most interesting ones? See whether you can tell how and for what purpose each container is used.

Making Food Better. I. Find the list you made of things which primitive people still had to learn before they

could have better food. See whether you thought of the things about which you have now read. Should you add anything to your list?

II. Primitive people had still other things to learn before they could have better food. Think of as many things as you can and list them on your paper. Save your list, so that you can look back at it after you have read the next story in this book.

Some Books to Read. You will want to read more about these early people. Perhaps you can find some stories about them in your readers or in other books. Here are the names of three good books that have stories about the early people :

The First Days of Man by Frederick A. Kummer

Look in the Table of Contents to find which pages tell the story called "The First Bow and Arrow."

How the Present Came from the Past by Margaret E. Wells

Look in the Index to find which pages tell about man as the king of the forest ; about tamed animals ; and about the tools and weapons made by man.

The World We Live In and How It Came to Be by Gertrude Hartman

Look in the Table of Contents to find which pages tell the story called "The First Days of Man."

III. HOW PRIMITIVE PEOPLE BECAME FARMERS

The time came when the hunters began to tame some animals for pets. The pets taught their masters a wonderful new way of getting food. Later, the women learned still another way of feeding their families. What were these new ways of getting food? Did they change the ways in which people lived?

TAMING THE WILD ANIMALS

When you visit a farm, you usually look first for the farm animals. You see cows feeding in the pastures. You see horses working in the fields. You see pigs in their pens and chickens in the poultry yards. Perhaps you see sheep and goats and mules and turkeys. There may be a dog or two about the barn, and probably there are some cats and some kittens.

Farm animals are called *domestic animals*. That means they are tame and live under the care of men. The kinds of animals on the farm have been domestic animals for thousands of years. They have been tame animals for so long that we have almost forgotten they ever were wild

In the early days all the animals were wild. The forests and the hills were filled with them. Wild horses galloped over the plains. Packs of wolves howled and fought through the long nights. Wild cows, sheep, goats, hogs, and camels roamed about hunting for food.

Some of the animals traveled over the land alone or in pairs, each with his mate. Some lived in herds following a leader. This leader was usually the strongest and bravest animal of the herd.

At first, primitive men were afraid of all the animals. They watched fierce wild cats spring upon the smaller animals and kill them. They saw tigers kill huge elephants. They saw tigers kill men, too.

"Stay away from the animals," the people told their children. "They will do you harm. You cannot fight them. Run and hide when you see them."

In time, men learned that they did not need to fear all of the animals. Some of them were not fierce. Some of them did not live on flesh. They ate the grass or nibbled the tender leaves from the trees.

"The grass eaters are shy," the people told their children. "You do not need to fear them. They will run away when they see you. But stay away from the flesh eaters. Even the grass eaters are afraid of the flesh eaters."

After the hunters had learned to make weapons, they did not fear the animals. They could defend themselves against the fierce flesh eaters. They killed the fierce beasts and used their flesh for meat, their fat for candles, and their hides for shoes. They killed the grass eaters, too, in order to get more meat, fat, and hides.

After thousands of years men learned something more about animals. They discovered that they should not kill all kinds of animals. Some kinds of animals could be easily tamed and made very useful to their masters.

How did the primitive hunters learn which kinds could be tamed? How did they discover what use to make of the animals? Perhaps the children of the hunters helped in the discovery.

Suppose that one of the hunters had killed a wild dog. It was a mother dog. When the hunter picked up the body, he heard the cry of her babies. He followed the sound to a cave. There he found a litter of wild puppies. They were helpless little things, and the hunter felt sorry for them. He knew they would starve without their mother to feed them; so he carried them home.

When he reached home, he gave the puppies to his children. They warmed the puppies and fed

them. The puppies and the children played together, slept together, and ate together. They became great friends.

When the puppies became full grown, they were not fierce. They liked to be petted and handled. They liked to live where it was warm, and where there was plenty of food. They did not want to return to the woods or to the wild pack.

Then these tame dogs had puppies. They, too, lived in the homes of the hunters. They became tame like their parents and did not want to leave their masters.

Probably cats were tamed in the same way. A hunter found wild kittens. He carried the soft, furry little things home to his children. They warmed the kittens and cuddled them in their arms, just as you do your kitten. By the time they were grown cats, they had become quite gentle. They no longer wished to roam the forests. They had better food at home. They liked to lie by the fire and doze. They taught their kittens to live like tame animals, too.

The hunters tamed still other kinds of animals. Some made friends easily, but others were too timid. Some were gentle while they were young, but became fierce when they grew older. Cats and dogs and the

grass-eating animals were the easiest of all to tame. They were also the most useful.

How did people first find that animals could be useful? It may have been by watching their first pets. Perhaps a hunter saw a calf taking its food from the mother cow. He thought how good the milk would be for his children. Perhaps the cow was one which he had raised from a tiny calf. When he tried to take milk from her, she was not frightened. At last, he found the right way to milk her. He drank the milk and liked it. He gave some to his children to drink. He gave some to the kittens. They all drank it. The milk was good! What a wonderful discovery he had made! He could get a new food from his pet cow.

How did primitive people discover the way horses could help? Perhaps one of the hunters had a pet horse. The horse liked to follow his master on his hunts. One day the hunter killed a deer. He wanted to take the deer home to his family, but it was very heavy. After dragging it a little way, the man was tired. What could he do? Suddenly he had an idea. The horse was strong. He could help. Then the man may have lifted the deer to the horse's back and held it there to keep it from falling off. Or he may have used a vine to tie the deer to the

horse, so that the horse could drag it along. This hunter had made another great discovery — that animals could be used to carry loads.

In ways like these, men found good uses for many of the animals. Dogs helped men to hunt. Cats killed the mice which robbed the stores of food. Horses and oxen helped men to carry loads and do other work. Cows and goats gave milk to drink. The milk could also be made into butter and cheese. Sheep gave wool that could be made into cloth.

Again, people had changed their ways of living. They had found new and better ways of getting food. They no longer spent all their time hunting animals to kill them. Instead, they tamed some of the beasts, cared for them, and let the beasts help them to live better and more easily.

Stories about Taming Animals. You will probably want to know more about how primitive people learned to tame the animals and make them useful. These books will tell you many of the things you wish to know :

Taming the Animals by William L. Nida

The World We Live In and How It Came to Be by
Gertrude Hartman

Look in the Table of Contents of *The World We Live In and How It Came to Be* and find the pages which have the story called "Man the Animal Tamer."

Taming Wild Animals. I. Do you like to imagine the things that happened so long ago that nobody knows exactly what took place? Try to imagine how one of the events listed below may have happened. You might tell the story to the class, or make a picture that will tell the story, or get some of your classmates to help you act it.

1. Taming a wild horse.
2. Capturing some wild elephants.
3. Learning that cats will keep the cave free from mice.
4. Making pets of some chickens.
5. Finding a scared little puma kitten.
6. Taking home a young squirrel.

II. If you know a good story about how wild animals are tamed today, tell it to your classmates.

Kinds of Animals. I. Divide a sheet of paper into two columns. In one column write the names of all the grass-eating animals you can think of. In the other column write the names of all the flesh-eating animals that you know. Which list is longer?

II. Make a list of all the kinds of domestic animals you know. Opposite the name of each kind, write what that animal does to help men.

USING TAMED ANIMALS

In time, many people came to depend upon their tame animals for much of their food. They began to keep large flocks and herds of animals, so as to have all the food they wanted and have it near by whenever they needed it. The animals needed much

care. They had to be watched day and night. Usually the men took turns watching them. The time came when the men in a tribe or family spent most of their time tending the flocks.

The people who raised large flocks and herds were called *shepherds*. The shepherds protected the animals from the wild beasts. They guarded them from robbers. They watched to see that none of them ran away and were lost. They took care of the sick animals. They milked the goats and cows.

The chief work of the shepherds was finding food for the animals. The flocks and herds fed upon grass. When they had eaten the grass in one place, the shepherds had to take them to new fields. No one owned land in those days. The land was free for all to use. The shepherds who first reached a good pasture could stay there unless a stronger band of shepherds drove them away.

The shepherds traveled slowly with their herds when they went to find new pastures. They took their families with them. They carried their household goods — everything they owned. They drove their flocks and herds before them. The men walked ahead, tending to the animals and keeping a watchful eye on each high rock or clump of trees for fear of robbers and of fierce beasts. The women walked



THE SHEPHERDS

The shepherds traveled from one river valley to another hunting fresh pastures for their flocks and herds. They traveled in groups. They carried their belongings with them.

behind, driving the animals that were loaded with the household goods. The children walked with the women or rode the animals.

Where were the shepherds going? Often they did not know. They did not know where fresh grass could be found. They must wander about until they found it. When they remembered pastures they had used before, they went to them each year.

It was hard to travel to new pastures. During the summer water was scarce in many places. Then the grass became thin and dry. The animals grew weak and gave little milk. The shepherds could find few plants to eat. Many times they were thirsty and hungry. Many times their feet ached.

But the shepherds could not stop. They did not dare do that. They must travel on in search of green river valleys, or their animals would die of starvation. If the animals died, the people might die, too. They had little food besides what they got from their herds.

But, oh, their joy when they did find new pastures! Fresh fields of grass! Growing food for the hungry animals! Water for them to drink! Pastures! Once more people and animals were safe.

Perhaps you think it was fun to travel about from one place to another hunting grass for the animals.

But it was a hard life. The shepherds could not live in houses. They lived in tents made of skins or of cloth woven from the hair of their camels and sheep. They could not have furniture or stoves or many dishes. They could carry with them only the things they needed most — a few bowls, some skins for holding milk and cheese, their tents, a rug or two, and some skins for covers when sleeping.

Some of the shepherds did not like this hard life. They grew tired of moving about. So they settled down to live in one place.

How did the people who settled down get food for their animals? Did they let them starve? No, they did not settle down until they found some river valley where food grew all the year round. They had learned that river valleys were good places to live. The rivers watered the soil, so that grass and plants could grow even when there was no rain. While other parts of the land were dry and brown, the valleys were green with growing plants. Was it any wonder that the shepherds wished to settle in the valleys?

As time passed, the river valleys became filled with shepherds and their flocks. Many of them never left these fertile pasture lands. Why should they? They could wander far and never find better

feeding grounds. River valleys have always been important to people.

The shepherds changed their ways of living when they settled down in the valleys. They gave up their tents and built houses. They began to live in villages because they could be safer living close together. After a while, they thought the pasture lands of the valley belonged to them. They fought other tribes that tried to settle along the river.

The shepherds went on raising animals and using them to help with the work. They used the milk for food and the wool for clothing. If an animal had been killed by accident, they would use its meat, its fat, and its hide, too. But they did not often kill the animals just for food. They thought the animals were too valuable to be killed. They needed them for milk and wool. They wanted them to raise young and make the herds larger.

Not all the shepherds settled down in the river valleys. Many of them kept on traveling about. Food-gatherers and food-hunters still wandered about, too. But such people did not live so well as the settled people did. They did not have such good food or so much of it. They were not so safe. They did not improve their ways of living so much as the settled people did.

Shepherds of Long Ago. Perhaps some of you could make interesting pictures that will tell how the primitive shepherds traveled to new pastures. If you plan to make a picture, you will need to find the answers to these questions :

1. How did the shepherds dress?
2. What different kinds of animals did they have in their flocks?
3. How did they move the flocks and protect them?
4. How did they care for their families while traveling?
5. What dangers did they meet on the way?

You can find many of the answers to these questions in a book called *Palestine and Syria*, by Louise M. Mohr, Carleton Washburne, and Willard W. Beatty. Look in the Table of Contents to see on what pages you will find the story, "In a Nomad Camp of Long Ago." Read the story thoughtfully. If you plan your pictures carefully, they will help you to understand the life of the primitive shepherd. The picture shown opposite page 54 in this book will help you to understand how shepherds traveled.

Flocks and Herds. Some of the early shepherds had large flocks and herds. How do you think they got so many tamed animals? How do stock raisers today get large flocks and herds?

Shepherds of Today. I. The shepherd people of today cannot live on the best land. The best land is needed for raising food, and the farmers own it. The shepherds live on the edges of the deserts, on the sides of the mountains, and on the northern plains where the climate is too cold or too dry for farming. Such land is called *grazing land*.

Look in your geographies and find grazing lands, or places where you think shepherds may be feeding their flocks. You can find out whether you have chosen the right places by reading about those places. Then make a list of the places where shepherds live today.

II. Find pictures which will show you how the shepherds of today live and travel about. You will find some pictures in your geographies. You will find excellent pictures in many numbers of *The National Geographic Magazine*. Some of the pictures you find will tell you interesting things about raising animals for food and clothing. Some will tell you facts about the exciting adventures the shepherds have. Most of the pictures will tell you how the shepherds dress. Talk over the facts the pictures tell you.

TAMING THE WILD PLANTS

While the shepherds tended their flocks in the great river valleys, the women were probably busy getting plant foods for their families. They dug roots from the ground. They searched for grain and vegetables. They carried home loads of nuts, fruit, and berries. They worked hard, often walking long distances to find plants that would give them food.

By and by, the women found a better way of doing their work. They made a wonderful discovery. They found that they could tame the plants just as the men had tamed the animals. They could make

plants grow near their own tents or houses and have them near at hand to eat.

We do not know how women made this discovery. Perhaps it was by accident. Maybe a woman, hunting for food, found some young cabbage plants. They were too small to eat. They needed time to grow larger. She wondered what to do. If she picked them, they would be wasted. If she left them, some other woman would find them.

Perhaps this woman thought of a way to save her cabbages. She would take the plants with her and put them in the ground near her home. There they could go on growing. She could watch them grow and eat them when they were large enough.

So she dug carefully around the roots. She took care to keep plenty of soil around the roots. She carried the plants to her home. She chose a place to plant them near her door, where she could watch them and protect them from the animals. She made holes in the ground and set the plants in the holes. She pressed the dirt around them and then left them to grow. The cabbages grew well in the new place. At last they were large and full. They were ready to be eaten.

Perhaps the neighbors of this woman went to the fields and found other young plants and made

gardens, too. They found carrots, onions, cabbages — all the plants they liked best for food. They liked this new way of getting food. They had become gardeners.

But how did the women learn to plant seeds? Perhaps some woman watched her plants grow. She saw them blossom, go to seed, and then wither and die. Perhaps she saw this happen time after time.

A woman may have hidden grain in the ground for winter use. Perhaps she forgot the grain. Then, when spring came, she saw the grain stalks sprouting through the earth.

Perhaps a woman spilled some grain. She may have picked up all she could, but a few seeds remained on the ground. A few days later she may have found tiny plants beginning to grow where the seeds had lain.

Perhaps one of these things led a woman to try planting some seeds which she had gathered. She saw little green shoots come up out of the ground. The plants grew tall and strong. The flowers came. The seeds formed. Then the plants withered and died. But before they died, she gathered the new seeds and saved them. In spring she placed them in the ground as she had done before. The same kind of plant came up.



Courtesy New York Museum of Science and Industry

TAMING THE WILD PLANTS

Primitive women learned to plant seeds, and to care for the plants which they raised. In the picture you see one of the early women farmers. What are the other people in the picture doing?

In time, women began to understand more about seeds and plants and about how to make them grow. They discovered that they could harvest many grains of wheat for each seed that was planted. What a discovery that was to those primitive people!

In some such way as this the wives of the shepherds became farmers. At first, they did not think of farming as we do. They thought of it only as another way of getting plants for food. But as time went on, farming became a new way of living and working.

The primitive women were not good farmers. There were many things they needed to know before they could become good farmers. They did not clear the land and make big fields. They planted their seeds in little patches just outside their doors. They did not plow the land so that they could plant their seeds deep in the earth. They only scratched the soil on top. They did not raise many plants or very fine plants at first.

Perhaps the women would have been better farmers if they could have had better tools. What tools did they use?

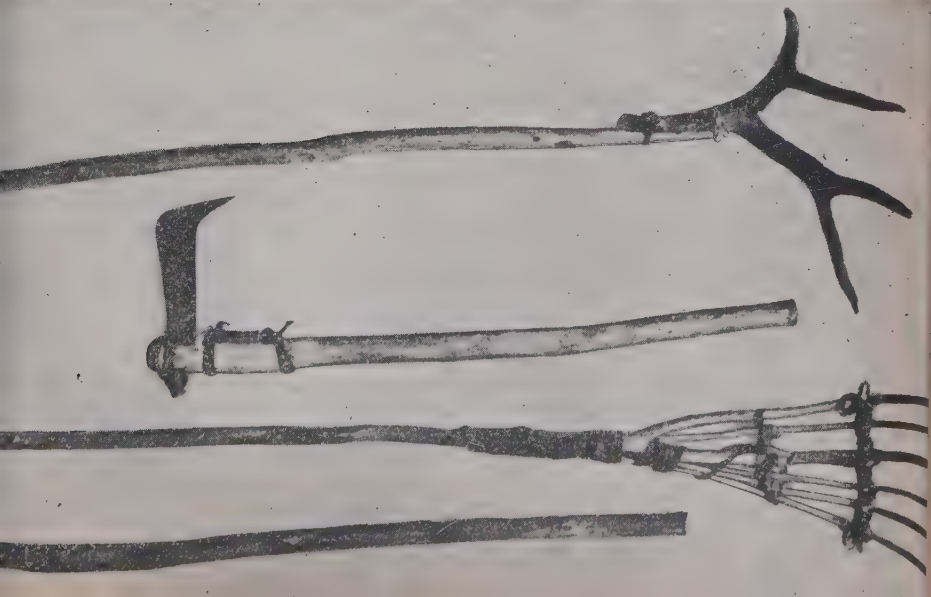
At first they used a digging stick. This was a smooth, straight stick, bigger at one end than at the other. The small end was made sharp and hard by burning it slowly in hot coals and ashes. The



PRIMITIVE FARM TOOLS

This primitive farmer used a forked branch of a tree for her plow. Some other primitive farm tools are shown in the picture below. How do you think these tools were made?

Courtesy American Museum of Natural History



women used these digging sticks to get roots out of the ground, to dig holes, or to break up hard soil.

Later, a woman farmer made a digging stick that had a flat end, not a pointed end. She sharpened the edge of the flat end and made a kind of spade.

The women also invented a tool for digging up weeds and for loosening the earth around the plants. Perhaps some woman had been trying to dig up the weeds with her old digging stick. It was slow work. She needed a better tool. What could she use? She looked about her. Near her was the branch of a tree lying on the ground.

The woman took up a sharp stone and sat down on the ground beside the branch. Hack! Hack! Hack! What was she doing? She was trying to cut the branch so that she could use it in her garden. Hack! Hack! Hack! Finally the branch was cut in two. She picked up one part and threw it away. She took up the other part and began to pull up the weeds with it. It was just the shape she needed. It was a hoe. With this hoe she could dig around her plants. She could loosen the earth to let in the air and sunshine. She could dig up the weeds.

When women began farming larger pieces of ground, they needed better tools. They made a plow. At first the plow was a small tree. They used

it with all the branches sticking out in every direction. They pulled the tree along over the ground, and the branches scratched the earth. But that was too heavy. They trimmed off some of the branches. Finally they left only one forked branch on the tree. The fork dug into the earth as the sharp blade of a steel plow does today.

These first farm tools were crude and hard to use. They have been improved a great deal since those early days. But nothing has been found to take the place of hoes and spades and plows. The same kinds of tools have helped farmers ever since.

With these crude tools the early farmers raised plants for food. They went on farming in this way for years and years. Then slowly, slowly, the ways of farming changed and became much better.

Reading about the First Farmers. If you wish to know more about the taming of plants, read the interesting stories about early farmers in these books :

Dan-Hur and the First Farmers by William L. Nida

The Early Farmers by Katharine Elizabeth Dopp

Taming the Wild Grasses by Elizabeth Forbes O'Hara

Making Gardens. I. Sometimes gardens are made by transplanting vegetables or flowers from one place to another. If you have helped make a garden in this way, perhaps you can explain to the class how you did it.

What kinds of tools did you use? What kinds of plants did you transplant? Do you think the early farmers might have learned about raising plants by transplanting some they found growing wild?

II. Do you know what four things it takes to make most plants grow well? If you do not know, perhaps you can find out. The early farmers had to have these four things just as our farmers have them today.

Early Garden Tools. Try making some garden tools from the same materials that primitive women used. Can you make a hoe from a tree branch? Can you make a digging stick? Can you make a plow? Why should it be easier for you to make these tools than it was for primitive women to make them? After you have made the tools, try using them.

The Story of Early Food Getting. You have been reading about how primitive people got their food in the days long ago. First they gathered it as they needed it. Next they began to hunt for special foods. Then they got food from animals they had tamed. And then they began to tame plants and raise the food near their homes. These four ways of getting food have given the people special names. The names are the *food-gatherers*, the *food-hunters*, the *shepherds*, and the *early farmers*.

Tell the story of how each group got its food. You may tell it by drawing pictures. You may tell it by acting. You may write it in story form and read it to the class. Which way would you choose?

Perhaps you may care to add to your story of getting food the story of how each group of people lived.

IV. THE VALLEY OF THE NILE

Thousands of years ago some shepherds wandered into the valley of the Nile River. In that valley the pasture was so fine that the shepherds stayed there. In time the shepherds became farmers and changed their ways of living. What were some of the many changes that took place?

A VALLEY IN A DESERT

No one knows just where farming first began. It must have begun in some fertile river valley, where a tribe of shepherds had settled down to live. Inside the covers of your book you will find maps which show some of the fertile river valleys of Europe and Asia. Probably it was in one of these valleys that farming started.

Perhaps farming started in China, in the valley of the Yangtze River. It may have begun in India, in the valley of the Indus River. It may have begun in Babylonia, in the valley between the Tigris River and the Euphrates River. It may have started in Europe, along the Danube River. Find these rivers on maps in your geographies.

Many people think the first farmers lived in the valley of the Nile River. We do not know whether that is true or not. But we do know that farming began very early there. We know that the people of the Nile Valley were among the first to lay aside their primitive ways of living and to learn to live in new and better ways. They learned to build houses. They learned to live in cities. They learned to make beautiful and useful things thousands of years ago.

When people have reasoned out how to build houses and cities and to make beautiful and useful things, we say that they are *civilized*. We call these better ways of living *civilization*. We say that people who have not learned to do these things are *uncivilized*.

On the opposite page is a map of the continent of Africa. It is a great continent, and there are many rivers in it. But the largest river in Africa is the Nile River. Find it on the map. See how many small streams flow together to make this great river, which flows northward into the Mediterranean Sea.

The Nile Valley was just a narrow strip of grass-land lying along the river. No one lived there at first. Crocodiles sunned themselves along the banks of the muddy river. Birds flew about.



MEDITERRANEAN SEA

NILE R.

RED SEA
GULF OF ADEN

AFRICA

On the opposite page is a map of the main part of the Nile River. Notice what a narrow valley it flows through. The dark strip on the map shows this valley. This strip of valley was green with pasture, because the Nile kept the soil moist.

One day a weary band of shepherds wandered into this valley looking for pasture. Imagine their delight when they saw the land before them! Wild grain growing on the banks of the river! Miles and miles of fresh green grass! The great winding river flowing slowly between its banks!

The shepherds found that the valley was narrow. They could travel east for only a few miles. Then they would come to high cliffs and sand. They could travel west for only a few miles. Again they would find high cliffs. Beyond the cliffs for hundreds of miles there was just sand — deep, yellow sand. It was the desert we call the great Sahara Desert.

But the shepherds found they could travel to the north and the south for days and weeks, and even months, and find grass everywhere.

"This valley is very long," the shepherds said. "It is all closed in. The desert and the cliffs will keep others out. The valley shall be ours."

But the valley did not remain hidden. Other tribes came. In time, shepherds were living all



EGYPT

SINAI

along the river. They lived in little tent villages at first. When they found they did not need to hunt for food any more, they began to build mud houses. They learned to build these houses on the high parts of the land, because the Nile River overflowed its banks every summer. When it overflowed, there was a great flood. The shepherds had to be careful, or their flocks and their homes would be washed away.

But the floods made the Nile Valley a good place in which to live. It seldom rains in the Nile Valley. Plants could not grow there if it were not for the floods. People could not live there without the floods because they would not be able to get food. Floods water the land and take the place of rains. But what makes the floods?

The water of the Nile River comes from the mountains in the center of Africa. There each spring the rain falls for days and days. As the water runs down the sides of the mountains, it flows into brooks and little streams. These small streams carry the water into the big Nile River. The river rises higher and higher. It flows faster and faster, too, rushing its great load of water down to the Mediterranean Sea. At last, so much water pours into the Nile River that the banks cannot hold it all. The water floods the valley.

Thick, muddy water covers the land for several miles on each side of the river. The water gives to the land the rich soil which it has washed down from the mountain. The part of the land which has been watered by the flood becomes green with grass and other plants. The part which the water does not reach stays sandy and bare, and is of no use.

The river must have seemed very dangerous to the shepherds the first time they saw the flood. Probably they were worried at first. But they found that the water always went back again. They found, also, that the flood wet the land and made the plants grow. So, in time, they learned to like the flood because they understood what it did for them.

With such a fine place to live in, the shepherds had a chance to learn better ways of doing things. For a while, the men probably did little work besides tending their flocks. For a while, the women probably went on gathering the wild plants. Then some of the women learned to sow seeds and raise plants. Farming had started in the valley of the Nile.

Probably the farmers continued for thousands of years doing their work as other primitive farmers had done it. But as time went on, they learned better ways of farming. Then they could raise more food than they needed for their own families. They

could have some to sell. When that happened, other kinds of work could be done. Civilization could begin.

The Nile River Valley. I. Find pictures of the Nile River and the valley. Find pictures of the Sahara Desert. Study these pictures to get facts about the valley. Talk over in class the facts that you find.

II. Read in your geographies about the overflow of the Nile River. Find out at what time the overflow takes place; how long the water stays on the land; and how the people feel about the overflow.

III. Make a model of the Nile Valley on the sand table. Read carefully all you can find out about the valley, so that you will be able to make the model correctly.

Your teacher will tell you some things about making models. Think how you can show: (1) the river; (2) the cliffs and the desert; (3) the mountains to the south; and (4) the Mediterranean Sea on the north. How can you show the parts of the land that are moistened by the river and those parts that are not? How can you show the kinds of animals and the kinds of plants which are to be found there? Will you model the valley as it was when the shepherds first arrived, or as it was after the valley had become civilized?

A Song for the Nile. Perhaps you could write a song to the Nile River such as you think the shepherds may have sung each year when the flood came. Would it be a song of praise or of fear?

CIVILIZATION COMES TO EGYPT

The country that grew up in the Nile Valley was called Egypt. Suppose you had visited Egypt after the people had been farming for hundreds of years. What would you have seen?

You would have seen the land on both sides of the river covered with farms. For hundreds of miles the farms lay between the cliffs and the river banks. Large farms and small farms! Acres of growing grain! Vineyards of purple grapes! Gardens of flowers and vegetables! Good food, and plenty of it!

You would have seen boats sailing up and down the river. Boats loaded with grain and stone and lumber and animals! Boats filled with people! Big boats and little boats!

You would have seen great tombs, called *pyramids*, scattered along the west bank of the river. The ancient kings of Egypt were buried in these tombs. Some of the pyramids were so large that a single one covered several acres of land. They were so high that they looked like small mountains in the deserts.

You would have seen villages and cities everywhere through the valley. Thousands of people lived and worked in these villages and cities. They had many new ways of making their living.



Courtesy Metropolitan Museum of Art

MAKING SUN-DRIED BRICKS

Some of them probably made bricks for a living. In the paintings which Egyptians made long ago there were many pictures of people making bricks. The drawing above was made from one of those paintings. It shows men making bricks from good Nile mud. This mud, usually mixed with straw, was worked with a hoe, carried away in buckets and dumped in a pile on the ground. Then the bricks were shaped with a wooden mold. You can see one man lifting this mold from a brick he has just shaped. The sun baked the bricks. The finished bricks were carried off to the builders in the way shown in the lower right-hand corner of the picture.

Some Egyptian workers made boats. Some made tools. Some made glass or cloth or jewelry. Some built pyramids. Some were priests or soldiers or officers of the king. Many, of course, were farmers.

All of these changes had come because the people of the Nile Valley had become civilized. How did they learn to do these new kinds of work?

When people first settled in Egypt, each family raised all the food and made all the things they needed. They got along without the things which they could not raise or make at home. But as the ways of farming improved, people had more time to spend in making things. Some of the men liked making things better than farming. These men learned to make things well.

Perhaps one man began making knives in his spare time. He liked to make knives, and he made fine ones. They were smooth and sharp and strong. All his friends wanted him to make knives for them. They paid him with wheat and onions and grapes. He became a knife maker and earned his living by doing this work.

Perhaps another farmer had several sons. He could not give all of them work on his little farm. Perhaps one of the sons knew how to make boats. He made a boat for a neighbor. The neighbor paid

him with grain or dates or cabbages. Soon he was earning all the food he needed by making boats for others.

So it happened that some of the people in Egypt learned to do other work besides farming. These new workers were called *craftsmen*. In time, the craftsmen became very skillful with their hands. They made many beautiful and useful things.

One after another the craftsmen began to leave the little villages where they had grown up. They moved to the larger towns. Many of them went to the place where the ruler and his officers lived. The towns grew larger and larger.

In time many of the craftsmen set up shops. They hired other men to work for them, as we do in factories today. Each shop had its own tools and its own ways of working. The older men taught the new workers exactly how to do the work. They made many beautiful things — carved chairs and chests and tables, lovely ornaments, toys, linen cloth, shoes, tools, and weapons. Some of these things have been found buried in the tombs of the kings.

The ruler of Egypt was called the *Pharaoh*. The Pharaoh was very powerful and wealthy. Many of the craftsmen worked for him. The stoneworkers brought marble and sandstone many miles to build

his palace. The carpenters carved doors and walls and furniture for it. The artists painted the walls. The weavers made hangings. The potters molded beautiful vases and dishes. The metalworkers made ornaments. Everyone helped to make the Pharaoh's house beautiful.

The Pharaoh's officers were called *nobles*. Some of the nobles had charge of his mines. Some had charge of his land, his granaries, or his army. Some had charge of the buildings that the craftsmen were making. Some collected taxes. The nobles were wealthy and powerful.

In the households of the Pharaoh and the nobles were many slaves. The slaves were people who had been taken prisoners by the Egyptians in war. They had to work hard. Often they were not treated well. Sometimes the slaves lived right in their master's home. Sometimes they lived in little shelters outside their master's house.

Some of the priests lived in the cities, too. These men had charge of the temples. They hired artists and craftsmen to build the temples and to keep them in repair. They made the temples beautiful.

There were still other workers living in the cities. Most of the people could not read or write. Workers called *scribes* wrote letters for the people and carried

on much of their business. There were sailors who had boats on the Nile River and who carried goods from one city to another for the craftsmen and the farmers. There were fishermen and traders and soldiers, too.

All of these people had work to do in the cities. They bought their food from the farmers and paid for it by making things for them or by doing work for them.

The people of Egypt had many comforts after the craftsmen learned to make these new things. Probably they lived better than people had ever lived before that time. They had become civilized.

The Beginnings of Civilization. Explain why civilization did not start until the farmers had learned to sow seeds and raise food on their farms.

Egypt Becomes Civilized. I. Would you like to learn more about Egypt? Here is a list of topics which may interest you :

1. How the pyramids were built.
2. What the Great Sphinx is.
3. What the temples and tombs tell about old Egypt.
4. How the Nile River helped to give Egypt a great civilization.

II. Find out also about the craftsmen of Egypt: the quarrymen, the carpenters, the toolmakers, the glass-makers, and the weavers. Find out about the scribes,

the sailors, and the soldiers. Choose one or more of these workers and be ready to tell what kind of work they did, how they did their work, and what tools or weapons they used.

Reading about Egypt. Here are some books which will help you to find out more about Egypt :

Egyptians of Long Ago by Louise Mohr, Carleton Washburne, and Willard W. Beatty

America's Roots in the Past by Daniel J. and Dorothea Beeby

The Study Readers, Book Six by Alberta Walker and Mary R. Parkman

To find the pages which tell about Egypt in *America's Roots in the Past*, look in the Index under *Egypt* and *Egyptian*; in *The Study Readers, Book Six*, look in the Index under *Egypt*.

Famous True Stories of Egypt. Ask your teacher to read to the class the Bible story of Joseph and his life in the service of the Pharaoh. Another Bible story that you will like is the story of Moses and his kinsmen, the Hebrews. Both of these stories show how powerful the Egyptian kings were.

Seeing Contrasts. We are living in a civilized country. Make a list of some of the things we have that make us know we are civilized. Make a list of some of the things the Egyptians had that make us know they were also civilized. Are some things in these two lists the same? Are all of them the same? Are the ways of living in civilized countries always the same?

THE FARMS OF EGYPT

Some of the farms in ancient Egypt grew to be very large. They were owned by the nobles. The nobles hired overseers to look after the farms and bought slaves to do the farm work. Sometimes hundreds of slaves were needed to do the work on one of these large farms. The slaves worked hard. Often they did not have enough to eat. Often they were treated cruelly. It was hard to direct the work of so many people, and the overseers were often unkind.

The nobles had many buildings on their farms. The buildings were placed close together, and a high mud wall shut them all in. The owner had a large and comfortable house built for his own use on his visits to the farm. The house was made of sun-dried brick and was painted a bright color. It was built around a yard called a *courtyard*.

The house had a flat roof. Often an awning was stretched above the roof to shade it. The houses had only a few windows because the Egyptians wished to keep out the hot sun. Sometimes there were awnings on the windows, too.

Near the house were pleasant gardens, where beautiful flowers and fresh vegetables grew. There were orchards, too, and long rows of grapevines.



THE HOME OF A WEALTHY EGYPTIAN

Are you surprised to see a pool and a shower bath? The picture in the lower right corner shows the granaries.

There were many other buildings on these farms. There were granaries, where the grain was stored. There were storerooms, where the wine, the meat, the fruits, and the vegetables were kept. There were workrooms for the slaves.

Some of the slaves worked in the fields. The others made the things needed on the farm. Some were weavers who made all the cloth and rugs. Some baked bread, or made wine, or ground grain. For each of these tasks there was a workroom and a group of workers.

Sometimes the master visited his farm. Then he heard all the farm news. The overseer told him how the slaves were working. He told him how many new animals had been born, and how well the crops were growing. He told him what repairs were needed on the buildings. Then the master and the overseer planned the work together.

The owner often brought his friends with him to the farm. Sometimes they went on crocodile hunts along the banks of the Nile. They went fishing and boating, too. All the nobles had their own boats and used them for traveling.

Only part of the land in Egypt was owned by the rich nobles. Most of it was owned by the Pharaoh. The Pharaoh rented some of his land to poor farmers,

called *peasants*, who farmed it and made their living from it. They paid their taxes by giving the Pharaoh a large part of the crops they raised.

The peasants were not allowed to leave their land. They had to keep on raising food for the Pharaoh and the people who lived in the cities. When a peasant died, his sons carried on his work. If he had no sons, the Pharaoh let some other peasant use the land.

The farms of the peasants were under the charge of an officer of the Pharaoh. This officer told the farmers what to plant, how to care for the crop, and when to harvest it. Each year, when the crops were harvested, the Pharaoh's officers collected the taxes from the peasant farmers. Sometimes nearly all that the peasants raised had to go for taxes. The peasants were punished if they had not raised enough crops to pay the heavy taxes.

The peasant farmers did not live on their land, as the farmers in America do. They lived in little villages near by. The houses were closely packed together. The streets were narrow. The houses leaned one against another in groups of five or six.

The houses were all made of mud. Wood and stone had to be brought a long distance. That made them too expensive to use. Mud cost nothing.

The only trouble the Egyptians had with mud houses was at floodtime. The villages were built upon small hills. Once in a while, the Nile flood rose so high that it reached the little mud huts.

Imagine how people must feel at such a time. They can see the water creeping up the slopes of the little hill. How far will it come? Will it rise higher than last year? Will it come clear to the top? Now it is even with the lowest houses. Now it is running into the streets — a thick, muddy stream. Now it is creeping into the courtyards and covering the floors of the little rooms. The walls begin to crack and crumble. Roofs tumble down. Walls fall in. The houses are gone! The whole village has melted away!

This was not so great a loss as you might think. Soon the water went back within the banks of the Nile. The people used the fresh mud to build new homes. It did not take the hot sun long to dry the walls. In a short time a new village was built.

The village houses were very small. Some of them were nothing more than little sheds open on one side. Others were one-room huts opening on a courtyard.

The courtyard was the best part of the village house. It was like a room without a roof. The



AN EGYPTIAN PEASANT FAMILY LONG AGO

women did all of their work there — cooking, spinning, weaving cloth and baskets, making clothing and pottery. The family ate their meals there. Even the animals were kept in the courtyard. You can see a peasant family in their courtyard in the picture above.

The houses were dark, close, and uncomfortable. The bed was merely a raised platform of mud. The cupboards were holes in the mud walls. The fireplace was made of burned clay. Sometimes the only other furniture in the house was a chest. This was used for storing the food and clothing.

The dishes were made of clay, baked hard. The women made big bowls to hold the food and to cook it in. They made middle-sized bowls for serving the food. They made little bowls to hold the seeds for the gardens. All of these bowls were made of baked clay or mud.

What would the people of Egypt have done without the good Nile mud!

Life on a Nobleman's Farm. Make a set of pictures to show the life of a noble on his farm. What important things will you choose to tell with your pictures? Think of good titles for your pictures.

Life in a Village. I. Make a model of an Egyptian village. Try to make the model look as much like an ancient Egyptian village as possible. What material will you use for the houses? For the walls? Will you draw a plan for the village first?

II. Prepare to tell a story about a flood that swept away a whole village. Imagine real people living in the village. Try to think how they must have felt when they saw the water rising up the sides of the little hill where the village stood. Then tell your story.

III. Why did the Egyptian farmers live in villages? Do our farmers today live in villages? Why?

IV. Tell how important the Nile mud was to the Egyptians. In what ways did they use it in their homes? How did it help some of them to earn a living for themselves and their families?

HOW THE EGYPTIAN FARMERS WORKED

Our farmers plow their fields and then sow the seed in the long ditches, or furrows, that the plow has made. You will be surprised to learn that the Egyptian farmer sowed his seed first and then plowed the field. The land was soft and wet after the flood. Nothing had to be done to get it ready for the seed. The seed was just dropped on the earth. Then the farmer plowed the field to turn the seed under.

The peasant farmers did not have many tools. Often a peasant worked for years before he was able to buy a plow. Even if he did manage to get a plow, he often did not have an ox to pull it. He had to drag it himself, or hitch his wife or sons to it! Sometimes, when he did not have a plow, he turned a herd of hogs or cattle into the field. The animals trampled the seed into the soft earth with their sharp hoofs.

The farmers raised many kinds of plants. The chief grain crops were barley and wheat. The chief fruit crop was grapes. Another important crop was flax. Linen cloth was made from flax.

The Egyptians told the story of their ways of farming in paintings on the walls of their tombs. At the top of the next two pages are drawings of two of these picture stories, showing how the Egyptians plowed and sowed their seeds.



SOWING SEEDS AND PLOWING THEM UNDER

Harvesttime was a busy season for the farmers who had planted grain in the beautiful Nile Valley. On the large farms of the nobles there were many workers to help at harvesttime. But on the small farms there were only the peasant and his family to work. The pictures at the bottom of this page and the opposite page show how the Egyptians told the story of their harvesting. First, the reapers cut



REAPING AND LOADING THE RIPENED GRAIN

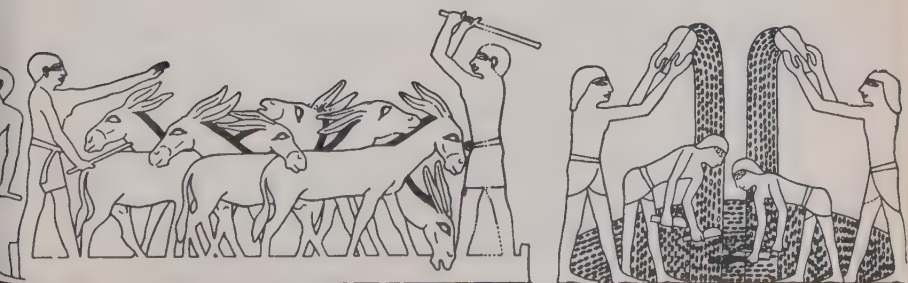


Courtesy Metropolitan Museum of Art

SHEEP TRAMPLING THE SEEDS INTO THE GROUND

the grain. Each reaper grabbed a handful of stalks with one hand, cut them with a sickle, and threw the stalks to the ground. The sickle was a curved knife with a handle made of wood. At first, the farmers used sharp flints for the blade. Later, they used copper or bronze blades.

Next, the harvesters went over the field and tied the stalks together in bunches. Then they carried



Courtesy Metropolitan Museum of Art

THRESHING AND WINNOWING THE GRAIN

the bunches to a large stack. Sometimes the bunches were loaded on donkeys. The stacks of grain were then left to dry.

When the grain was dry, it was ready to be threshed. It was placed on a dry, hard, smooth floor made of dried mud. The grain was spread out evenly. Herds of donkeys or cattle were driven back and forth across the floor. Their hoofs loosened the kernels from their coverings.

As the men drove the animals back and forth across the threshing floor, they sang their harvest songs. Here is one of their favorite harvest songs. Can you imagine the workers singing it?

“Thresh for yourselves, thresh for yourselves, oxen !
Thresh for yourselves, thresh for yourselves !
Straw to eat, barley for your masters ;
Give yourself no rest, it is cool today.”

Sometimes a tool called a *flail* was used to thresh the grain. The flail was made of a short, thick club tied to a wooden handle in such a way that the club could swing about freely. The grain was beaten with the flail until the kernels fell out.

Then the straw was gathered and piled up for food for the animals. The kernels of grain were placed in flat scoops or shallow containers.

Next, the grain was cleaned, measured, and placed in baskets. After that, it was stored in the granaries. Look back at the pictures of the home of a wealthy Egyptian shown earlier in this section. You will find these pictures opposite page 84. The one in the lower right-hand corner shows the kind of granaries in which early Egyptians often stored their grains. Can you see the granaries in the larger picture, too? The peasants stored their grain in their houses and hid it so that it would not be stolen. Sometimes they made marks on the walls of their houses to show the number of measures they had or the number of measures they owed the Pharaoh.

The Farmers of the Nile. I. Make a set of pictures to show the different kinds of work the Egyptian farmers had to do. Put the pictures in a row. If they are in the right order, they will tell the story of how an Egyptian farmer spent his day.

II. Perhaps you would like to make a play about the farmer's life, instead of showing it in pictures. Divide the class into eight groups, and let each group choose one of these kinds of work :

1. Building houses.
2. Making clothing.
3. Making tools.
4. Making wine.
5. Caring for animals.
6. Plowing and planting seeds.
7. Harvesting and threshing grain.
8. Preparing food for the family's meals.

Each group may plan the best way to show how each kind of work was done. Perhaps the threshing group may care to write a threshing song. The plowing and planting group may care to write a planting song. They could sing these songs as they acted their parts.

Could you help make tools to use in your group play? Could you help make costumes? Could you help plan your group play?

MAKING NEW FARM LANDS

The number of people in Egypt grew fast. In time, the farmers could not raise enough food for everyone. People began to be hungry. Prices of food became so high that the poor people could not buy all they needed.

"We must have more food," the Egyptians said. "Are we to go hungry?"

But the farmers could not raise more food because there was no more land. You remember that the only land where plants could grow was the narrow strip of land flooded by the Nile. The farmers could not raise food in the desert. What were they to do?

This was a hard problem. The farmers worried about it. The nobles worried about it. The priests worried about it. The Pharaoh himself worried about it. And all the time they were thinking about

it, people were starving. At last, it was decided to make more farm land by spreading the floodwater over some of the desert land.

The Pharaoh's officers sent slaves to dig ditches. They sent soldiers to dig ditches. They ordered the farmers to dig ditches. Everyone must help to make new farm lands.

They dug the ditches, or canals, east and west from the river. Then they dug other canals to join those canals. They dug them through farm after farm, clear to the edge of the desert. But they did not stop there. On and on they went, through the hot, dry desert sand.

Then the officers ordered the water to be turned into the canals. The canal gates were opened. The water flowed into the canals from the river. On and on it flowed. Through the old farm land! Through the hot sandy desert! The desert land soaked up the water. The land became wet. It was ready for the farmers to use.

The way of carrying water to land by canals, which the Egyptians thought out, is called *irrigation*. When land is watered in this way, we say the land is *irrigated*.

But it was not enough just to irrigate the desert land during the regular floodtimes. The Egyptians

had to find some way to hold back the floodwater, so that they could let it out a little at a time during the whole year. They built great basins with gates. In the late summer, when the flood came, the gates of the basins were opened and the basins were filled with water. Then the gates were closed. Later in the year, when the water in the river was low, the farmers could open the gates of the basins and let the water flow through the canals to their fields.

Next, the Egyptians had to find some way to keep the water from flooding the land during the weeks when the flood was rising. What could they do to prevent this?

The slaves and the soldiers and the farmers were once more put to work. This time they built dikes. The dikes were strong, high walls along the banks of the river. They kept the floodwaters from the land. By the time the flood was highest, the crops had been harvested. Then the gates were opened, and the water rushed over the land. After it had left the land, another crop was planted. In that way the farmers were able to raise several crops each year.

There was great rejoicing as each canal or dike or basin was finished. The Pharaoh then ordered a holiday. The people had a feast. The priest offered



THE NILE VALLEY IRRIGATED

Here is a bird's-eye view of part of the Nile Valley after the Egyptians had irrigated it. See the dikes, or strong walls, along the banks of the river. They kept the flood waters from the land. Study the canals. Some of them ran straight from the Nile to the dark pools. The water was held in these pools until needed.

sacrifices to the Nile River. Often the Pharaoh came and did his part by opening the gates to let the water fill the new basin or canal.

Many people helped with this great work. Nobles and priests gave their ideas. Slaves, farmers, and soldiers did the work. The Pharaoh's officers told the workers what to do. The craftsmen made tools.



Philip D. Gendreau

AN OLD EGYPTIAN WATER BUCKET

Often the stored-up water in the basins and canals got low during a dry season. If you had been in Egypt long ago during a dry season, you might have seen a farmer very much like the one in the picture above trying to get some water out of an irrigation canal to use on his fields. When the water in the canals was low, the farmer often had to get it out by hand. He used a bucket on the end of a long pole. When he had filled the bucket, he poured the water into the smaller canals that ran through his fields. His queer water bucket was called a "shadoof." Egyptian farmers still use this old-fashioned way of getting water for their fields.

This work was not done all at one time. It took years and years. Work of this sort was going on all the time. New canals were needed. Old ones had to be repaired.

The Egyptians had other problems, too. They learned to think out the answers to problems, to study, to ask questions, and to wonder about things.

“Where does the water of the Nile come from?” they asked.

Then the Pharaoh sent his soldiers far up the Nile to find out. They found that it came from the high mountains far south of Egypt.

“How long is it between floods?” they asked.

The priests began to keep a record of the floods. They found that they came always at the same time — so many moons apart.

“But how long is it from one moon to the next?” they asked.

Then they learned many things about time that nobody had ever thought of. They called the time between moons a *month*. They learned about the length of the day, of the month, of the year, of the seasons. They even made a calendar — the first calendar!

So the Egyptians went on asking questions and finding the answers to them. Every time they

worked out a new problem, they learned some new thing that has helped the world ever since. That is the way they built up the wonderful civilization that lasted for thousands of years.

How Egypt Became Larger. I. Make some pictures which will show the story of how the Egyptians made more land for their farmers. Make the pictures large enough to be seen from a distance. Show how all the different workers helped. Show how the work was done.

Use these pictures for a moving picture and give a show for a visiting class. Choose boys and girls to make short talks explaining the pictures.

II. Look in an encyclopedia for the topics *Egypt* and *Irrigation*, and see what is told about Egyptian canals and dams. The people who build our dams and irrigation ditches are called *engineers*. Do you think the men who built the Egyptian irrigation ditches should have been called engineers, too? Why?

Some Great Irrigation Dams. Find pictures that will tell about the great irrigation dams we are building in the United States. Look in the Index of your geography under *Irrigation*. Then turn to the pages listed in the Index and read what they tell you about the work we are doing in irrigating our deserts. Why are we building these dams and irrigation ditches?

V. GREAT CHANGES IN FARMING

For hundreds of years farmers have used the land to raise plants for food. During most of that time they did little to improve their ways of working or their tools. They were able to raise only enough food for a small number of people. But in the last one hundred years men have learned better ways of farming. More people can be fed now than ever before. What made men change the old ways of farming? How did the change help the people to make a better living?

MORE PEOPLE NEED FOOD

You have seen how the Egyptians learned to farm. You have seen how they built a wonderful civilization in the valley of the Nile. But the Egyptians were not the only ancient people who knew how to farm. They were not the only civilized people of that time, either. People of other river valleys knew how to raise plants, too. Some learned how to farm just as the Egyptians did, by discovering it themselves. Some learned how to farm by watching other people.

Many of these people learned to be good farmers. They raised more food than they needed for their

own families. They were able to sell food to others. Then, just as in Egypt, some of the people learned to do other kinds of work. They became craftsmen. They became sailors and traders. They learned to mine, to fish, and to cut down trees.

People lived much better after they learned to do all these different kinds of work. They had better homes. They wore better clothing. They used better weapons and tools. They had better dishes and more beautiful ornaments. They learned to write. All of these things helped make them more civilized.

In this way groups of civilized people grew up in many places. At first these groups could be found only in the river valleys of northern Africa and Asia. Later they could be found in Europe. At last they were in almost all parts of the world. But almost always, people had to learn to farm before they could be civilized.

Farming has changed the world in another way, too. It has made it possible for large numbers of people to live upon the earth. At first, as you know, only a few people lived upon the earth. That was in the days when food was hard to get. As people learned to raise food, they grew in numbers. The river valleys filled up with people, and some moved

to the plains. The plains filled up, and some moved to the hillsides. Always the best farm land was used first.

In some places the number of people grew very fast. Then it was hard for the farmers to get enough food for everyone. Often people were hungry. Sometimes they starved.

In most parts of the world the number of people grew very slowly. Each farmer raised food for his own family and a little more to sell. If too many people were born in that part of the world, they could not live. They could not get enough food to eat.

Today all that is changed. The number of people living in the world has almost doubled. Today millions and millions of people live upon the earth. There are so many of them that one person could not count them all.

Imagine all those people walking in one long line past your house. On, on, they would come — men, women, and children. People from Asia, from Africa, from Australia! People from Europe, from Canada, from South America! People from all the islands of the oceans, and from all over our own United States! There would be people talking in a hundred languages. What a long line it would be! Tramp, tramp, tramp! All day and all night, month

after month, these people would be going past your house.

There are nearly two billion people living upon the earth today. A billion is a thousand millions. The number of people living upon the earth at one time is called the *population* of the earth. The population of the earth has never been so large as it is today. One reason for the large population is that the farmers of the world have learned to raise great amounts of food. How did this happen?

Some Facts about the World's People. On this page and the following page are some statements about the world's people. Copy each statement on your paper. When you come to the blank in the sentence, look at the list of words following the sentences on page 107. Choose the word or words that will make each statement tell a complete fact. Write the word or words where they belong in the sentence.

1. A group of primitive people who stayed together is a
2. Tribes of primitive people who wandered about for pasture lands are called
3. Land that is rich and moist enough to grow crops is said to be
4. The shepherds looked for fertile lands in
.....
5. When the shepherds settled down and raised crops, they became

6. Workers who made things with their hands were called
7. After farming had begun, people had time to become
8. Land that is too dry for crops is land.
9. Sending water out over dry land is called
10. People who live as savages live are
11. The better ways of living are called
12. As people learned to raise more and more food, the of the earth grew greater and greater.

farmers

desert

civilized

shepherds

fertile

uncivilized

tribe

irrigation

civilization

craftsmen

river valleys

population

FARMERS FIND A NEW WAY OF WORKING

For thousands of years farmers went on working with the same crude tools that had been used by the Egyptians or by other early people. They used plows very much like the wooden plows made by the first farmers. They used wooden flails for threshing the grain. They did all their work with their hands. Because they had no better tools to work with, they worked very hard and raised only small crops.

The farmers taught their sons how to work. They showed them how to plow, how to sow the seed, how

to cut and thresh the grain. They did not teach them to try to find better and easier ways of doing their farm work. They did not teach them to make new kinds of tools. They did not teach them to find new ways of using their tools. The sons did their work just as their fathers had done it. No changes! No new ideas! No wish for improvement! So it went for centuries.

Until one hundred years ago farmers in all countries in the world were doing most of their work with their hands. Some farmers used oxen to draw their plows. Some used horses or camels or mules. But often the farmer hitched his wife or sons to the plow. The farmer walked up and down the field sowing his grain by hand. He raked the hay into piles with a hand rake. He swung the heavy flail to thresh his grain. He used a hand hoe for weeding his crop and for loosening the hard earth around the plants.

The best tool which farmers had for cutting wheat was the *cradle*. A cradle has a sharp blade for cutting the grain and a frame for catching the stalks after they are cut. The men swung the cradle with their strong arms. It was slow work, cutting wheat with a cradle. A man could harvest only about two acres of grain a day.



International Harvester Company

THE CRADLE

A man using a cradle can cut only two acres of grain a day.

Wheat has to be harvested within ten days after it is ripe. Using a cradle meant that a farmer could not raise more than twenty acres of wheat unless he had helpers. Helpers were hard to get. All the neighbors were harvesting wheat at the same time and could not help one another. For this reason most farmers could have only small farms.

Farmers worked this way in all parts of the earth. In America, one hundred years ago, men could have all the land they could use. Land was cheap then. But farmers could not care for large farms. Their tools were not good enough.

People did not live well in those days. More food was needed. But the farmers could not raise more food with their poor tools.

A little more than one hundred years ago, people became interested in the kinds of tools used by the workers. Better tools were given to the carpenters, the masons, the clothmakers, the miners. All kinds of inventions were being made. People were talking about these inventions, too. Then people began to think about the tools used by the farmers.

"No wonder the farmers cannot raise enough food for the people to eat," they said. "Just look at the plows they are using! Just look at the cradles they have for cutting grain! Surely better tools than

those can be made for farmers. They need tools that will make their work easier and that will help them get more work done."

Cyrus McCormick was one of the men who thought the farmers needed better tools. He lived in the United States of America, and he wanted the farmers to raise more food.

"A good way to help the farmers," he thought, "is to make them some new tools. I will make one to cut the grain. I will make one that can be pulled by horses. Then the men can ride. They will not get so tired, and they can work much faster. I will make a reaper that will not waste a stalk of grain."

So Cyrus McCormick invented a reaper. The picture opposite page 112 shows the first test of this reaper. You see that it is drawn by a horse. A boy is riding the horse. A man is walking beside the reaper to rake off the wheat in little piles as it is cut. The inventor is walking behind the reaper to make sure that everything goes well.

This first reaper was improved a great deal by Mr. McCormick and other men. They added seats for the workers. They changed the reaper, so that only one worker was necessary. They made it tie up the grain in little bundles. The reaper was a success, and the farmers liked it.

Then other inventors made tools for the farmers. They made plows with polished steel blades that could cut through the sticky, black earth. They made cultivators for breaking up the soil. The cultivators took the place of the hoe. They made seeders for sowing the grain. They made hay rakes that could be drawn by horses or mules. They invented a new kind of thresher, too. This was such a help to the farmers that they put the old wooden flails way up in the lofts of their barns and never took them down again.

The farmers gave up their slow-moving oxen. They bought horses and mules to pull their new tools through the fields. They bought more land, too. They could have much larger farms with the new tools to help them.

With the help of these new horse-drawn tools, the farmers raised more food than had ever before been raised. Loads of grain and fruits and vegetables poured into the cities. All of this food was eaten. Still it was not enough to feed the people of America. What was the trouble?

The same thing had happened in America that had happened in Egypt thousands of years before. The population had grown. Great numbers of people had come from other countries to live in



International Harvester Company

THE NEW REAPER

McCormick tried his new reaper in a field of grain. Friends and neighbors gathered to see what the new machine could do. How they cheered as the stalks fell!

America. Millions of new people had come. They all had to be fed.

"Give us more food," they told the farmers. "We are still hungry. We can eat much more food. You must find out ways to raise more food."

Old Ways of Farming. I. One hundred years ago American farmers could have had large tracts of land. Land was very cheap in those days. Why did not each farmer buy thousands of acres? Was it not foolish for him to plant only forty or fifty acres of wheat when he might have planted thousands of acres? Talk over this question.

II. Does it not seem strange to you that the farmers did not begin earlier to improve their ways of farming? The farmers taught their sons to make tools, to use tools, and to mend tools. But they did not teach one very important thing about tools. Do you remember what it was they failed to teach their boys?

New Machines for Farmers. There are many interesting stories about how the new farming machines were invented. You can probably find these stories in your geographies, readers, or other books. See what you can find about: (1) the first steel plow; (2) the first reaper; and (3) the first threshing machine.

You can find the stories in your encyclopedias, too, if you look for the topic *Agriculture* or the topic *Reaping machines*.

As you read, notice how much the horse was used. Which of these inventions were to be drawn by horses?

FOOD BECOMES PLENTIFUL

Things went on in this way for a number of years. The farmers bought more land, more tools, and more horses and mules to help them work. They raised all the food they could.

The people bought all the food the farmers raised. But it was not enough. The population kept on growing. Food cost a great deal because it was scarce. There was suffering among the people. Something had to be done.

"Farmers need still better tools," people said. "We must have more food. We must have cheaper food. Give the farmers the kinds of tools that are used in the factories. Give them stronger tools, sharper tools! Give them fast-moving tools. Then they can raise enough food to keep us from starving."

Again the inventors went to work. Again they made new tools. And such tools as they were! Nothing like them had ever been seen before. They were not even called tools any more. They were machines.

Men made huge plows, fastening several together into one machine. They made combines that moved through the fields cutting the grain, threshing it, and cleaning it at the same time. They made cultivators

that could weed several rows of vegetables at one time.

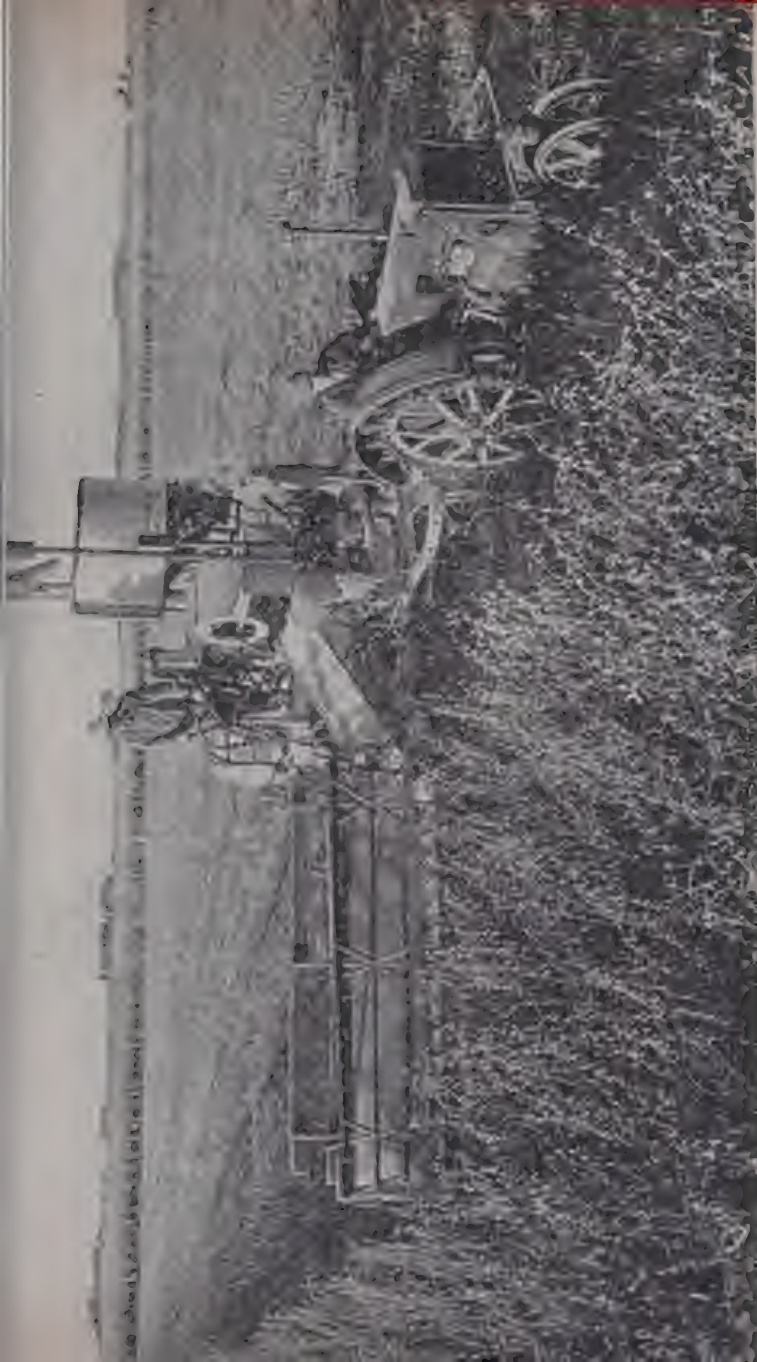
"These machines must move faster," said the inventors. "Horses and mules are too slow. They eat too much food, too. We will make the farmer some 'iron mules.' They will not need to eat grain. They can feed on gasoline. They will go much faster than real mules can go."

So the inventors made tractors to pull the machines. A tractor was so strong that it could take the place of thirty horses. It could travel twice as fast as a horse, too.

The farmers were surprised when they saw what those "iron mules" could do. They took their new machines and their new tractors into the fields. They planted huge crops. They harvested them. And then they sent loads and loads of food to the markets of the cities. This time there was food enough for all. At last, the farmers had learned how to raise plenty of food.

These great changes in farming have happened in the last one hundred years. Your fathers and grandfathers and great-grandfathers have helped make them. This last change is taking place today.

Most of the farmers of the world still have small farms. Many of them are still using horse-drawn



J. I. Case Company

THE IRON MULE

Here is an "iron mule" pulling a reaper. Such a mule! He does not get tired. He does not mind running, running all day long. He does not eat grain. The grain which once was fed to horses and mules and oxen may now be fed to people. The iron mule feeds on gasoline.

tools Many are even using hand tools. But a few are using the big machines and the tractors made by the inventors. From year to year more farmers are learning how to make use of these wonderful new farm machines.

Men must have large farms if they wish to use these big machines. Machines cost a great deal. Men who own small farms usually cannot afford to buy tractors and combines. Probably it will be a long time before all the farmers will be using the big machines. Perhaps this will never happen.

But that is not important. The important thing is that now it is possible to raise all the food that is needed. Even with a population of more than two billion people, there are machines enough and farm lands enough to raise food for all. No one needs to go hungry because food is scarce.

New Ways of Farming. What difference in farming did the second great change make? Look in your geographies or in other books for stories about the newest inventions: (1) the great plows; (2) the combine; and (3) the tractor. Look also for stories of other new ways of farming: (1) fertilizing the land before planting crops; and (2) raising wheat in the West.

You might look in an encyclopedia, too. If you do, you will want to look for such topics as *Agriculture*, *Inventions*, and *Reaping machines*.

A Picture Story of Farming. I. Find all the pictures you can which will show the different ways in which farmers have cut grain. Find, if you can, pictures that will show: (1) the stone sickle used by the Egyptians; (2) the cradle; (3) the reaper; and (4) the combine.

II. Find pictures that will show farmers today, in different countries, at work using: (1) hand tools; (2) horse-drawn tools; and (3) machine-drawn tools.

III. Find pictures which will show the newest kinds of farm machinery.

Other Kinds of Farming. In the beginning of this book you read about Mr. Anderson's two farms. The story of his factory farm tells of one way in which men raise food. The story of his hillside farm tells of another way in which men raise food.

But there are still other ways that you have not read about in this book. Perhaps you would like to read about other kinds of farms. You will find such stories in your geographies. Make two lists of these stories. On one page give the names of all the stories you can find that tell of ways of farming in America. On another page give the names of the stories which tell of ways of farming in other countries. Be sure to give the name of the book, the name of the author, and the page or pages on which the story is to be found. Check your lists to see that the names of the books and authors are correctly spelled. These lists of stories are called *bibliographies*. Keep the lists in your notebook. Read as many of these stories as you can.

As you read, try to answer these questions. Perhaps the story you are reading will not give the answers to all

of the questions. Do not be discouraged if you cannot answer every question. Just find all the answers you can.

1. What country, or part of a country, are you reading about? Look at the map of the world inside the covers of this book. Can you find about where the place would be on that map?
2. What kinds of farm tools are used by the farmers you are reading about?
3. How do the farmers in that country move their tools over the land? Do they drag them by hand? Do they use animals for this work? Do they use tractors?
4. Are the farms in that country usually large ones or small ones?
5. What kinds of crops are raised on those farms?
6. Do the farmers live on the farms, or do they live in a village near by?
7. In what ways is the kind of farm you are reading about different from Mr. Anderson's factory farm? From his hillside farm?

VI. OUR NEW FOOD PROBLEM

Since farmers can now raise all the food people need, you may think we have no more food problems. But that is not true. We have a new problem that is going to be hard for us to work out. What is this new problem? How are we going to handle it? What more should we learn about food-getting?

THE FOOD WORKERS MUST BE PAID

Every year the farmers of our country raise tons and tons of food for the people to eat. They raise thousands of bushels of grain. They raise great numbers of sheep and cattle and hogs for meat. They raise acres of vegetables and fruit. It is good food, fresh and clean and wholesome. There is plenty of this food, too — enough to keep everyone from being hungry.

But, even with all this food there are still hungry children. There are still men and women who are worried and sick because they do not get the food they need. Why is this true? What happens to all the food the farmers raise?

Most people do not buy their food from the farmers. They buy food from the grocers, the butchers, and

the bakers. But before these storekeepers can sell the food, it passes through the hands of many people. Each time that food changes hands, the price becomes higher.

It is not because food is scarce that many people still go hungry. It is because food is costly, and many people do not have money with which to buy it. Let us see what happens to food the farmer raises.

First of all, the food is carried from the farms to the cities in trains, in trucks, or on boats. It takes many workers to move all the food to the cities. Workers on the farm pack baskets and boxes and crates and barrels with good things to eat. Other workers drive trucks to carry the packed food to storage places or to huge elevators where the grain is stored. Other workers move the food from the stations or elevators to trains and trucks and boats. These workers lift and carry and roll and push the heavy boxes, crates, barrels, and baskets. Still other workers run the trains and trucks and boats. The cars have to be heated in cold weather to keep the food from freezing. They have to be cooled in hot weather to keep it from spoiling. There are many things that have to be done to get food to the cities to be sold, and all these things cost money. Many workers are needed.

When the food reaches the cities, part of it goes to the factories. The milk and cream must be bottled before it is sold. Some of the cream is made into butter or ice cream. Grain is ground into flour. Hogs are made into sausage or lard or hams. Machines peel and cut and dry and grind and mix and bake and can.

There are many workers in these food factories. Some clean and prepare the food. Some mix the food. Some cook it or prepare it in other ways. Some pack the food in boxes or cans after it is done. Some paste labels on the cans or boxes. Still others pack the boxes and cans away in the storerooms. Each man or woman has a special job to do. Together, these workers make the cookies, the canned goods, the ice cream, and the breakfast foods that you so much enjoy.

But not all the food that is carried into the cities goes to the factories. Many of the vegetables and fruits are eaten fresh. As soon as they are brought from the farm, they are carried to the great markets or to the warehouses of the food merchants. There they are bought by the grocers.

The warehouses are busy places. Imagine that you are visiting one of them. What do you see? You see some men packing food into refrigerators



R. I. Nesmith and Keystone View Company

WORKERS CARRYING FARM PRODUCTS

These workers help us by getting the food from the farm to the train. These men must be paid. For that reason the price of the food must be made a little higher.



PHOTO BY GORDON AND FISHMAN FROM NEW YORK

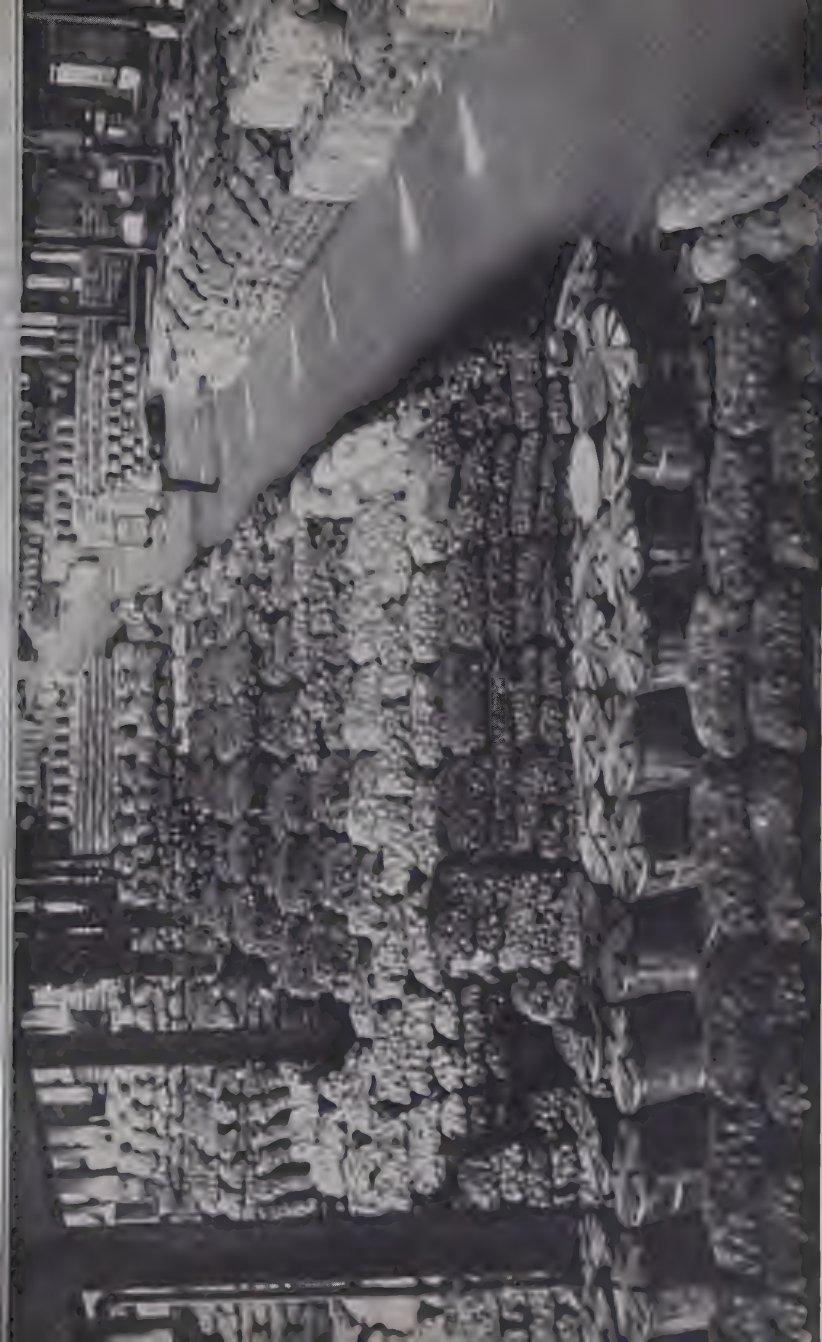
GETTING FOOD FROM TRAINS TO CUSTOMERS

Many men unload the trains of food that come into a great city each day. Others carry the food to the markets and warehouses and factories. Why does this make food cost more?

and cold-storage rooms. Others are piling food on shelves and emptying it into bins. Some are stacking sacks of potatoes in piles as high as the ceiling. Some are using wheelbarrows or hand trucks, moving barrels and boxes from one place to another. You see men loading and unloading trucks. Others weigh and measure and sort the food which is brought into the warehouse. Everyone is busy caring for the food the warehouse merchants have for sale.

One more thing you see in these warehouses. You see butchers, bakers, fruit and vegetable peddlers, and grocers looking at the food. They ask the price of it. They walk about, looking at the food. They pick out the things they think their customers will want to buy. They buy everything in large amounts — cartons, crates, barrels, and bushels. The grocers buy crates of tomatoes, of lettuce, of oranges. They buy big cartons of canned goods, of breakfast foods, of cookies or candy. The butchers buy whole hogs, to be cut up into pork chops and roasts. They buy halves of mutton or beef, to be cut up into roasts and steaks and chops. The bakers buy barrels of flour and sugar, and cartons of raisins and spices.

When the butchers and bakers and grocers have ordered all they need, they have the food sent to their stores. At last, the food is ready to be sold.



Keystone View Company

FARM PRODUCTS IN THE WAREHOUSE

In order to pay the men who work in this warehouse, a little more must be added to the price of food.

Think of the many pairs of hands that handle food after the farmer sells it! Think of the work that has to be done to get it ready for you to eat! The farmers do not do all the work of getting our food for us. It is true that they do the very important work of growing the food. But when the food leaves the farm, it goes to merchants, to factory workers, to truck drivers, to trainmen, to warehouse workers. Each one does his bit of work to make the food better, to move it, or to sell it. Each one has to be paid for his bit of work. All these wages make food cost a great deal of money.

Can all the people buy these costly foods? Do they all have money enough to pay for it?

Facts about Food Workers. I. On your paper, draw two columns — a narrow column and a wide one. Have the narrow column at the left of the paper. At the top of the narrow column write the title "Kinds of Workers." At the top of the wide column write "Things They Do."

In the first column write the names of all the kinds of workers you can think of who make their living by handling foods. In the second column write what each worker does. Does he pack food? Does he run a truck? Does he run an apple-paring machine? What does each one do?

Look at your paper. In listing the facts as you have listed them, you have made a chart.

II. Charts help us to understand the facts that we read. They help us to arrange the facts so that we can see easily and clearly what they mean.

Study your chart and the charts which your classmates have made. Place the charts on the wall where everyone can see them.

Which chart shows the greatest number of workers? Count all the different kinds of workers that the charts mention. Are you surprised to find how many there are?

Had you ever before stopped to think what a large number of people it takes to handle food? Does what you have learned help you to understand why food is expensive?

How Food Travels. Make a picture map showing everything that happens to one kind of food from the time it is harvested until it is eaten. Choose one kind of food. Show on the map: (1) where the food was grown; (2) how the food traveled to the place where it was sold; (3) where the food was stored; (4) where the food was changed into a new food (as *cream* into butter or cheese, *wheat* into flour, *flour* into bread, and so on); and (5) each place where the food was bought or sold. Does the picture map help you to see why food is expensive?

FOOD COSTS MONEY

After the food has been delivered to the store, the storekeepers place the cans and bags and boxes on their shelves. They put the meat, the butter, and the milk in their refrigerators to keep fresh. They arrange the fruit and vegetables attractively on

shelves or in the windows. They put candy and cakes in glass cases, where they will keep clean and fresh. At last, they are ready to sell the food to you and your mother and your neighbors.

Soon people come into the stores to buy the food. Some of them buy bread and butter and meat. They pick out the freshest vegetables and the best-looking fruit. They buy the best milk in the market and the freshest eggs. They buy cream and fine cheese. They buy cake and candy and choice nuts. They buy everything they need. These buyers are the ones who have plenty of money to spend for food. They are good customers, and the storekeepers want them to come back every day.

Other customers come into the stores to buy, too. They do not buy cakes and butter and cream. They buy only the most necessary things, like cabbage and bread and potatoes and beans. A few of them take dried fish or a piece of yellow cheese. They do not buy meat or fruit. These people do not carry away all the things they want. They take only what they need most.

There are other people who do not come into the stores to buy food. Some of them walk up and down the sidewalks looking into the windows or through the open doors. They see the fresh loaves of bread.



Philip D. Gendreau

AT THE GROCERY STORE

At last the food is ready for you to buy it. Many people have worked to get it ready. And now the grocer must add a little to the price he has paid for it. Why?

They see the pieces of red beef. They see yellow pears, rosy apples, and ripe strawberries. These people do not buy the food that is for sale — they just look at it. They have no money to spend.

This makes the shopkeepers unhappy. They stand behind their counters waiting for more customers to come in and buy food. The people do not come. The grocers' shelves are loaded with good things to eat. Their storerooms are packed with foods they wish to sell. It is good food — the best food that the people of the world have ever been able to buy. But the shopkeepers cannot sell it all.

Why is it that some of the people buy very little food and that others do not buy at all? Do they not need food? Are they not hungry?

Yes, these people do need food. Everyone has to eat if he is to keep well and strong. The people are hungry, too. Some of them are very hungry. They do not buy food because they have no money to spend for food. They are the people who are not earning a living.

It seems too bad that these hungry people do not have money to buy the food they need. The farmers have raised plenty of food for them. The grocers would be glad to sell food to them. But they cannot buy, for they have no way of earning money.

The people who are hungry are not the only ones who suffer when food is left on the shelves unsold. Many other people have a hard time, too.

When the food cannot be sold, many of the food workers are thrown out of work. The warehouse merchants put some of their trucks in the garage. They have to let some of the packers go, for there is not enough money to pay them. The railroad people leave many of their cars on the sidetracks. The grocers tell their clerks they can no longer pay them. The bakers say they do not need so many cooks and clerks. The owners of factories close down some of the machines, or perhaps they close the whole factory. There is no longer work for all of these people.

What happens to the farmer and the food he has raised? He cannot sell all of it. What he cannot sell must be left to spoil. This means that he, too, will have less money.

When all these workers have no way of earning a living, they cannot buy clothing for their families. Often they cannot even buy food for them. If they do not own their homes, they cannot pay rent. Then the people who earn money by renting houses lose money, too, and they cannot pay the people who work for them.

We have not yet learned how to get our tons of grain, our gallons of milk, and our carloads of vegetables and fruits to the people who are hungry. It does little good to the storekeepers to have food in the stores and markets if people cannot buy it. It does little good to the farmers to harvest giant crops of wheat and potatoes and apples if the crops cannot be used.

Can we learn how to keep people at work so that they will have money to buy food? This is our new problem. We must work at it and think about it until we find out what to do.

Six Important Foods. It is hard, sometimes, to know what kinds of foods to buy. The grocery stores have so many kinds that it is hard to choose. But mothers have to learn many things about foods, for they want to feed the family the best they can.

Most mothers know that we need six kinds of foods, and they try to buy them for us. The six kinds are: fruits, vegetables, cereals, sugar, dairy foods, and meat foods. We do not need all six kinds at each meal. But we do need to eat all kinds from time to time.

Do you know which foods belong to each of these groups? If not, you will want to learn about this, for you cannot choose your foods well until you know this.

Make a food chart. To do this, divide your paper into six columns. At the top of each column write one of the six principal kinds of food. The six are listed above.

Then in each column list the foods that belong to that kind. List as many as you can. Making such a chart will help you to learn how to choose foods wisely.

Buying Food. I. The next time you go to the grocery store, watch the people buy their food. What kinds of food are they buying? How much do they buy?

Find out which foods are the most expensive.

Find out which foods people buy when they do not have all the money they need for food. Watch those people buy and see how carefully they choose their food. Do they buy many kinds of food? Do they buy large amounts of food? Do you think they choose the right kinds of food?

II. Perhaps you do not know how much it costs to feed a family. Here is a way to find out.

Pretend that you have one dollar to spend. With that dollar you must plan to buy a whole dinner for your family. Make a list showing each thing you want. Your mother will tell you how much of each food you will need to buy in order to have enough for the family. Then take your list to the grocery store. Write the price of each food on your list. Then find out how much you must pay for the whole dinner. Would you be able to buy everything you planned with your one dollar?

Perhaps the dinner you planned cost much more than a dollar. If it did, find out what foods you could buy that would cost less than those you chose. See whether you can plan a dinner to cost a dollar or less. Try to be a wise buyer of food.

III. Find out, if you can, how much it costs each week to feed your family. Does it help you to see why some families can buy very little food?

The Food Problem Today. Make a set of posters that will tell your classmates the story suggested by one of the following statements :

1. A farmer harvests his grain but cannot sell it.
2. There is food on the grocery shelves while people go hungry.
3. A truck driver is told that there is no more work for him.

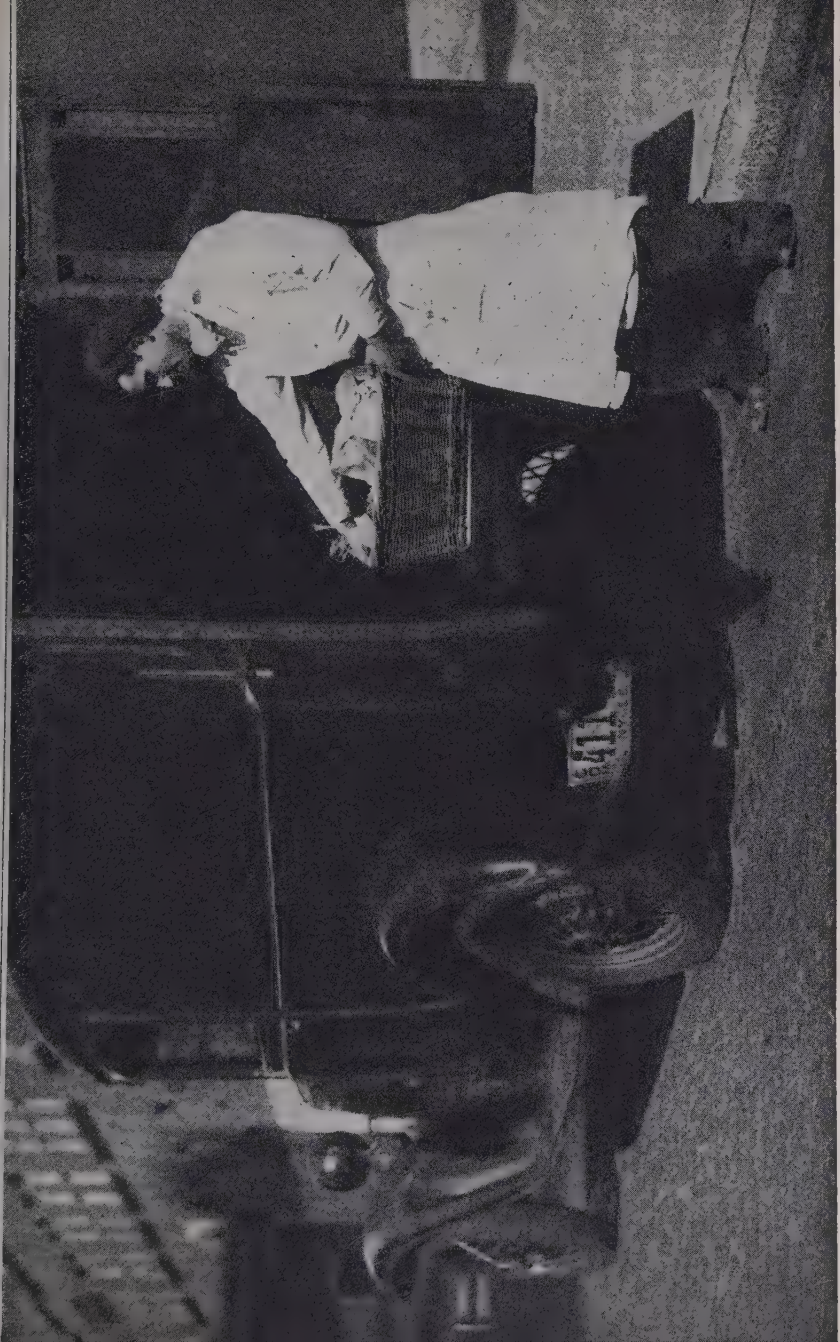
FOOD BUYERS MUST HAVE MONEY

For most people there are only two ways of getting food to eat. They may raise the food themselves, or they may buy it from others. Today most people buy their food. Even the farmers go to the stores for much of their food, just as city people do.

But people cannot buy food without money. How do they get their money?

There are many ways of earning a living. Some workers build houses. Some work in factories, making furniture or clothing or automobiles. Some work on the railroads or in mines or in lumber camps. Some nurse the sick or work in offices or teach school. People do hundreds of kinds of things for which they are paid.

Men and women used to make most of the things they needed by hand. Men made shoes by hand. Women made clothing by hand, even spinning the thread and weaving the cloth. But they do not



EARNING A LIVING

This man earns his living by delivering groceries. A big machine helps him.

often work that way any more. They use machines. They have such good machines now that much of the work is done very fast. Sometimes the work is done so fast that it is hard to find enough work for all the workers to do.

But we should not think of our machines as enemies. If we are wise, we can learn to use our machines in such a way that they will not do work that men and women wish to do.

Machines should work for us, help us, and protect us from hard toil.

Machines should do the work that is too hard or unpleasant for men and women to do. They should do work that is dangerous.

It is hard work to lift great weights. Let machines do it. They have no backs to break.

It is dangerous work to pour white-hot metals. Let machines do it. They have no hands and arms to burn.

It takes fast work to print a daily newspaper. Let machines do it. They do not mind hurry and confusion.

There is other work which cannot be done by machines. Doctors are needed to care for all of our sick people. Teachers are needed to show the people better ways of living. Workers are needed to change

poor farm land into growing forests. Foresters are needed to plant and nurse trees. Engineers are needed to drain swamps and to water the dry deserts. We need people to do thousands of things that we have not had time to do before.

Perhaps when you boys and girls are grown to be men and women, you will be doing many new kinds of work. Perhaps, too, you will have many new kinds of machines to help you do the work that men and women of today are doing by hand.

If our workers can learn to do these new kinds of work, they no longer need be idle. If they can learn to make their machines work for them, they no longer need strain and toil over hard, disagreeable work, as they now do. With the help of machines they will be able to earn good wages with which to buy all the food they need.

Can we learn to use machines and still have enough work for everyone to do? If we can, we shall be able to use all the food that the farmers raise. We can work out this new problem only if everyone will help. Boys and girls can help, too, by studying the problem and thinking about it.

Ways of Earning a Living. Make a list of all the ways of earning a living that you know about. Choose three kinds of work which you think you would enjoy doing.

Place a star before each one. Place a cross before each kind of work which you would not like to do.

Machines That Help. Find pictures that show machines which really help men. Show one machine for each kind of work : (1) hard work ; (2) dangerous work ; (3) disagreeable work ; (4) careful work ; and (5) fast work. Perhaps you can find more than one of each kind.

Thinking about New Problems. Read these questions and think about them. Perhaps you will want to talk about them in class. All people do not agree about the answers to these questions. Probably you and your classmates will not agree, either. But that does not matter. Perhaps you cannot find answers to all of your questions. But even if you cannot, you can *think* about them. Perhaps some day you will be able to find answers to them. Of course you do not wish to be like the boys and girls of over a hundred years ago, who did not think about new problems.

1. Foods are expensive because it takes the work of a great many people to make foods better. Is it a good thing to have all this work done? Would it be better to have plain foods, as the primitive people did, and have them cost less?
2. Many farmers buy some of their food at the grocery stores. Why do they not eat the food they raise, instead of going outside to buy it? Would it be better for them to eat only what they raise?
3. What are some of the kinds of work that machines should do? What are the kinds that people should do? What kinds of work are there that machines *cannot* do?

4. What is the most wonderful machine you have ever heard of? Why do you think it wonderful? Does it help men or harm them?
5. Should people be afraid to have machines made better? Give a good reason for your answer.
6. Look about your neighborhood and see what kinds of work need to be done there. What are some improvements which you would like to see? Could workers alone make these improvements, or would machines be needed to help?
7. How can machines make it possible for men and women to earn a living and still have enough free time to do many things they want to do?

THINKING BACK

Have you enjoyed the story of agriculture? Was it interesting to find out how men learned to raise and prepare foods? Perhaps you would like to think over some parts of the story that you like best. Perhaps you would like to see how much of the story you remember.

Below and on the next page are some questions. Think about each one. Then talk it over with your class.

- I. Why has it taken people a very, very long time to learn how to get plenty of food?
- II. Ways of getting food have grown better and better throughout the years. Can you name the different ways used and give them in the correct order?

- III. Would you have liked to live at some other time than the present? Give your reasons why.
- IV. Why do not all the people of the world use the most modern methods of raising food?
- V. What part of this whole story about food-getting did you most enjoy? Why did you like that part best?
- VI. What were some of the things in this story that surprised you?
- VII. If you were going to be a farmer, where would you want your farm to be? Why?
- VIII. Farming is one of the most important industries. Can you explain why that is true?
- IX. Women were probably the first farmers. For many years women did all the farming that was done. Today on most farms the men do more of the farming than the women do. What reasons can you give for the change?

UNIT II
THE STORY OF FIRE

Section I.	The Importance of Fire .	page 145
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Section III.	Fire, the Comfort Bringer .	page 175
Section IV.	Fire, the Worker . . .	page 201

I. THE IMPORTANCE OF FIRE

We have a servant who does more for us than any other helper we have. This servant helps us live comfortably. If it were not for this little worker, we should not be able to live any better than the primitive people did thousands of years ago. What is the name of this useful servant? What kinds of work does it do? How does it do this work for us?

THE GAME "COME SHE COMES"

"Come on," said Jane. "Let's play a game."

"And Father, too!" shouted Walter. "Please, Father, will you?"

It was just the right kind of evening for games and stories. It was the first cool evening of the year. A fire crackled in the fireplace.

"Let's play 'Come She Comes,'" suggested Jane.

"Oh, yes!" Tom and Walter shouted.

"Come She Comes" was the children's favorite game. They liked it best when Father played with them. He could think up such queer facts.

"You be IT, Dad, and we will guess," Jane said. Then she and the boys waited while Father thought up his word.

"Come she comes," he said at last.

"What letter does she come by?" Walter asked.

"*F* is the letter," was Father's answer.

"State the facts," said Tom. "And I feel sorry for you, Dad, if you give us any wrong clues."

"The thing I am thinking about," said Father, "is the most important thing in this room. In fact, it is the most useful thing we have in the whole house. It is probably the most useful thing in the whole world, too. At any rate, I think we are very lucky to have it. It has helped make almost everything we own. It is very old — the oldest thing here. It's a powerful worker.

"It is something that people often fight; but it can fight back, for it is very fierce. In one way we are afraid of it, and we have to handle it carefully always. But we like to have it near us. The wild animals are afraid of it, too.

"It is not always the same color. Sometimes it is scarlet. Sometimes it is orange. Sometimes it is streaked with blue and yellow. Sometimes it is big, and sometimes it is very small.

"That is all I am going to tell you. Now go ahead and guess."

"*Furniture*," said Tom. "Furniture is a useful servant. Some pieces are large, and some are

small. Some are very old. The covers are all colors, and that couch is streaked with blue and yellow. Is it *furniture*?"

Father shook his head.

"Furniture can't fight," said Jane, "and we aren't afraid of it!"

"It's *F*ather," said Walter. "That's it. He is the oldest one here, and of course nothing in the room is as important as he is. He's very useful — more useful than anything in our house. He's big now, but once he was small. We are sometimes afraid of him, too, and he's a wonderful fighter. Is it you, Dad?"

Father laughed. "I suppose I'm scarlet and orange and streaked with blue and yellow, am I? No, it's not I. Guess again," he said.

"*Fire*!" guessed Jane. "Is that right?"

"Right," said Father. "Now, if any of you can prove that even one of my facts is not true, I will treat the whole crowd to ice cream."

"Goody," said Jane. "Of course we can prove it."

So Walter started. "It's true that fire is the thing we are most afraid of here. Animals are afraid of it, and it can fight," he said. "The color is all right, too. But fire didn't help make almost everything we own."

"Prove it," said Father. "Name one article in this room that has been made without the help of fire, and you will get your treat."

"All right," said Walter. "Fire didn't help make this floor. It came from trees that grew in the woods."

"How about the machinery in the mill that sawed the logs into boards?" asked Father. "The machinery in Mr. Warren's mill is run by steam, and fire is needed to make steam."

"Fire didn't have anything to do with making that lamp," said Tom. "That is a pottery lamp, made from clay."

"How about the fire that baked the clay for the bowl, and the fire that melted the copper for the trimmings?" was Father's answer.

"Fire wasn't used to make this rug. It is all made by hand. Mother made it herself from rags." Jane was quite sure that she had caught Father this time.

"The rags were made in a cotton factory, where fire was used in making steam to run the machines or in making the electric power for running the machines. The dye which Mother used to color the rags was heated on our own cookstove." Father had caught Jane, too.



And so it went on. The children named everything in the room, but Father could always show that fire had been used sometime in making it. It

looked as though the children were not going to get a treat.

Suddenly Tom had a bright idea.

"This fire," he said, "is not old. It is very young. It was just started tonight. It is not the oldest thing in the room."

"But I did not mean this fire," argued Father. "I meant all fire — the gift of fire."

"If you did not mean this fire," Tom insisted, "then it is not in this room. Own up, Dad, you owe us a treat."

Then Father had to give in to them. There might be two ways of looking at the matter, he agreed. Tom did have a point on his side. So the evening ended in a jolly trip to the corner drugstore for ice cream at Father's expense.

FIRE AND THE COMMON THINGS ABOUT US

For many years people have been making things to use and to enjoy. They have made houses to live in and different kinds of furnishings to make them comfortable. They have made new kinds of clothing to wear. They have made automobiles to ride in. They have made many new machines and tools to work with. They have made many new kinds of food to eat.

Most of the things we need are made from common materials. They are made from clay, sand, water, trees, plants, animals, or minerals. Milk bottles are made from sand, dishes from clay, cereals from grain, and writing paper from trees.

But men cannot make milk bottles from sand, or paper from trees, or breakfast cereals from grain, or dishes from clay without help. Fire helps to make nearly everything that we use. It would take dozens of pages to list all the things that fire does for us, and all the things that it helps us make. The picture opposite page 148 shows you a few of the uses of fire.

The Use of Fire. Below and on the next page are some questions which you will enjoy thinking about and talking over with your classmates. Perhaps you will not know the answers to all of these questions. Perhaps some of them have more than one answer. For that reason you and your classmates may not agree about them. As you read more about fire, you may want to change some of your answers.

1. What do you think would happen if all the fires in the world suddenly went out and people had no way of lighting new ones? What things could you still have? What things could you not have? How would your ways of living change?
2. How do you suppose people first learned about fire? Could you make a good guess about this? How long do you think people have had fire?

3. What are some careless or foolish things people do with fire?
4. Can you tell a story that would prove that fire is a good friend but a dangerous enemy?

More Facts about Fire. As you talked over the answers to the questions above, you must have found out that there are some facts about fire that you do not know. What facts did you not know? What facts about fire would you like to find out?

Make a class list of the questions you want to have answered. Copy them on a large piece of cardboard and hang the list beside your bulletin board. Use the questions as a guide in your search for facts about fire. (Perhaps you would rather copy the questions in your notebooks.) As you read and find an answer to a question, talk it over in class.

II. LEARNING TO USE AND MAKE FIRE

Long, long ago, even before people lived in houses, primitive people learned about fire. They found some ways of using it, too. Ever since that time people have gone on using fire. How did men make this wonderful discovery of the many new uses of fire? How did fire change their ways of living?

THE DISCOVERY OF FIRE

It is hard for us to think what the world was like before people used fire. We have come to think that people cannot live without heated houses and without cooked food. But that is not true. For many thousands of years the primitive people lived on raw foods. They had no light at night except the light of the stars and the moon. They lived and died without even knowing about fire.

In the days before fire primitive people must have been very miserable much of the time. They must have been cold. They must have spent half of their time in darkness. The animals were luckier than the people. Wild cats had eyes that could see in the darkness. Bears and beavers had warm

fur which protected them from the cold. Sheep had wool. Camels had coats of thick hair. Birds had feathers. But the people had no warm coats, and their eyes could not see through the darkness. At night they had to crawl into a cave or a hollow place between the rocks and sleep until daylight came once again.

We do not know how the primitive people first learned to use fire. Perhaps it was by accident. We know that lightning often sets fire to trees. Dry branches of trees rubbing one against the other sometimes catch on fire. There are mountains, called *volcanoes*, that shoot up red-hot lava or live coals into the air. The lava or coals fall to the ground and set fire to the grass, the leaves, or even the trees on the mountain slopes. These things happen today. They could have happened long ago just as well.

Primitive people were frightened, perhaps, when they first saw a burning tree or a forest fire. Even today a forest fire frightens us. We become excited and even afraid as we see the flames spread from one tree to the next, or from one patch of grass to another.

Think how the primitive people must have felt! They saw the leaves and branches disappear. They saw the trees fall about them. They saw the grass

curl up and fade away. They felt the stinging heat on their bare bodies. They heard the roar and crackle. They saw the thick smoke and the red flames leaping and dancing about. Such stinging heat! Such roaring flames and choking smoke! Such terrifying noises! Was this great scarlet, licking thing a terrible monster that had come to eat them up? In their terror they probably hurried away, as fast as they could run, from the burning forest.

By and by, the fire must have died down, as all forest fires do. The frightened people perhaps went creeping back to the place where their forest had been. They could not stay away. They wanted to find out what had been leaping and dancing from tree to tree and singing such a terrible song. They had to find out what this monster had done.

They drew nearer and nearer. They went slowly, peeking from behind rocks. They saw that the fierce, dancing flames were no longer there. Only little curls of smoke rose from the burning logs. What was this smoke? Was it the same as the red monster they had seen before? Was he still alive? Would he hurt them? Or was he dead?

They could not answer these questions. They stood and looked. Then maybe one daring man

went still nearer. He felt the pleasant heat from the red coals. He held his hands toward the heat. He smiled and nodded to his more timid friends. They saw that he was not hurt. They saw that he liked it. They went nearer, and they warmed their hands and bodies, too. Someone shoved a smoking log with a stick to see what it would do. It did nothing to make them more afraid; so they stayed to enjoy the warmth.

The next time they saw a forest fire burning, perhaps someone thought of taking a few glowing coals or a charred log back to his cave. He found that it was pleasant to have a warm cave. He had found one use for fire.

Later, people must have learned how to keep a fire burning. They saw forest fires reach out for more wood or leaves or grass.

"Surely this is a hungry beast," one man may have thought. "It eats wood. It eats leaves. It is greedy. If it does not eat, it dies."

In time, people learned to keep their cave fires burning. They learned to add leaves and twigs to the few red coals which they had carried home to their caves. They learned to keep a fire alive for many days. They learned to keep the fires from spreading. They learned to make them blaze up

hotly, or die down and burn slowly. They learned some of the many different things a fire could do for them.

Men still feared fire even after they learned to tend it. They did not understand what fire was, but they knew it could harm them. Some of them thought it must be a great power — a kind of god. For that reason many of the early people worshiped fire.

Learning about Fire. I. The early people learned all they knew about fire by watching it, caring for it, and using it. They learned its dangers by being burned by it, and by seeing it destroy the things they liked. As they used the fire, they saw it die out or blow away or smother. They learned its usefulness by feeling its warmth, by seeing it turn soft clay into bricks hard as stone, and by seeing it melt hard metal.

How have *you* learned facts about fire? Can you think of four ways of learning about fire?

II. Make a list of the things you know about fire. Be sure to list facts about :

1. What things we burn for fuel.
2. What fire does for us.
3. How we control fire so that it does not harm us.

Now think how you learned each fact that you listed. If you learned it by watching a fire, put *W* after the fact. If you learned it by using fire, put *U* after the fact. If you learned it by reading about it, put *R* after the fact. If someone told you the fact, put *T* after the fact.

Fire, the Monster. Have you ever seen a forest fire? If not, perhaps you have seen a grass fire. Grass fires often happen in the spring or fall when people are burning the dead leaves and grass from their yards or from vacant lots near by. Even a grass fire sometimes frightens us, for it spreads quickly and is hard to put out. If you have not seen a forest fire or a grass fire, perhaps you have seen a large building burning.

Remember the biggest fire you have ever seen. Then talk over these questions :

1. Why is a fire like a great monster?
2. How do people fight fires in the city? In the country?
3. How do men today fight forest fires?
4. Why are people today less afraid of fires than the primitive people were?

A Story about Fire. Choose one of the following titles and write a good story to read to the class :

Seeing Fire for the First Time

The Fire near the Lumber Camp

John, the Forest Guard, Discovers Fire

Fighting the Grass Fire

Be sure to make the story interesting to your listeners. You can do this if you will try very hard to make your listeners *see* just what you saw as you wrote the story. Make them see the flames leaping up, the trees falling, the people hurrying about, and the animals running away. Try to make your listeners *hear* the fire, too. Make them hear the crackle of the flames and the shouting of the people. Use words that make clear pictures or sounds.

EARLY WAYS OF MAKING FIRE

For a long time the primitive people did not know how to light a fire. They could have fire only when they found a grass or forest fire burning and could carry some glowing coals to their caves or huts. They learned to tend their precious fires very carefully, for it was a great loss to have a fire go out. There was no way to start another one. They had to find more glowing coals somewhere.

Usually a family or a tribe put one person in charge of the fire. It was his duty to tend the fire night and day. Such a person was called a *fire tender*. The fire tender must be careful and wise. Often he was the most important person in the tribe.

Even with all this care the early people did lose their fires sometimes. Perhaps the fire tender did not put enough wood on it. Perhaps he put too much wood on it, and the fire died because it could not get air. Sometimes a heavy rain beat upon the fire, or the water of a flood put it out. Sometimes the fire was stolen!

Friends shared fire with one another. Giving a few coals to a tribe which had lost its fire was a real way to show friendship. Think of the comfort that came with those few coals. Heat for warmth

and for cooking! Light during the long nights! Protection from wild animals!

How did primitive people learn the ways of lighting a fire? Perhaps the people who worked with wood learned one way of lighting a fire. Suppose a worker with wood was trying to make a hole in a flat piece of wood. He had no metal tool. He could use only a sharp stick of hard wood to bore the hole. He held this stick between the palms of his two hands and rolled it very fast, first in one direction, then in the other. As he whirled the boring stick, he pressed its point down on the flat piece of wood.

The stick whirled and whirled. The hole grew deeper and deeper. A little circle of wood dust gathered about its edge. The point of the boring stick grew hotter and hotter. It began to smoke and then to glow. The edges of the hole began to glow, too. Finally the wood dust caught on fire. The blaze lasted only an instant and then died out. It all happened quickly — a puff of smoke, a tiny blaze, and it was all over! The worker did not understand what had happened. He did not know he had made fire.

But perhaps one time, when dry grass lay close to the hole, the grass caught fire and burned.



MAKING FIRE

Making fire was an important event in primitive times. Each time the spark came from the whirling stick or stone, those who saw it were filled with wonder.



Courtesy Boy Scouts of America

BOY SCOUTS LEARNING TO MAKE FIRE WITH A DRILL

The worker saw that it was really fire. He understood that he had lighted it. After that, of course, he made fire again with a hard boring stick and a piece of soft wood.

Other workers may have found another way of making fire. The primitive people used a sharp stone, called a *flint*, for making arrowheads and spearheads. The workers sharpened a piece of flint by striking it with an iron tool. Have you ever seen what happens when a horse's iron shoe strikes a stone? It makes a spark.

Perhaps some early maker of arrowheads saw sparks fly when he struck a piece of flint with his iron tool. Perhaps the sparks fell upon some dry leaves or grass and started a fire. What a surprise! Another way of starting a fire!

One day this same worker may have dropped one iron tool upon another iron tool. More sparks! He had learned two things. Striking iron on flint will make a spark. Striking iron on iron will make a spark.

Rubbing or striking will always make heat. When there is enough heat, there will be a spark or a blaze. Suppose you rub your two hands together. Do you feel them getting warm? Sometime try clapping your hands together. Keep on until you

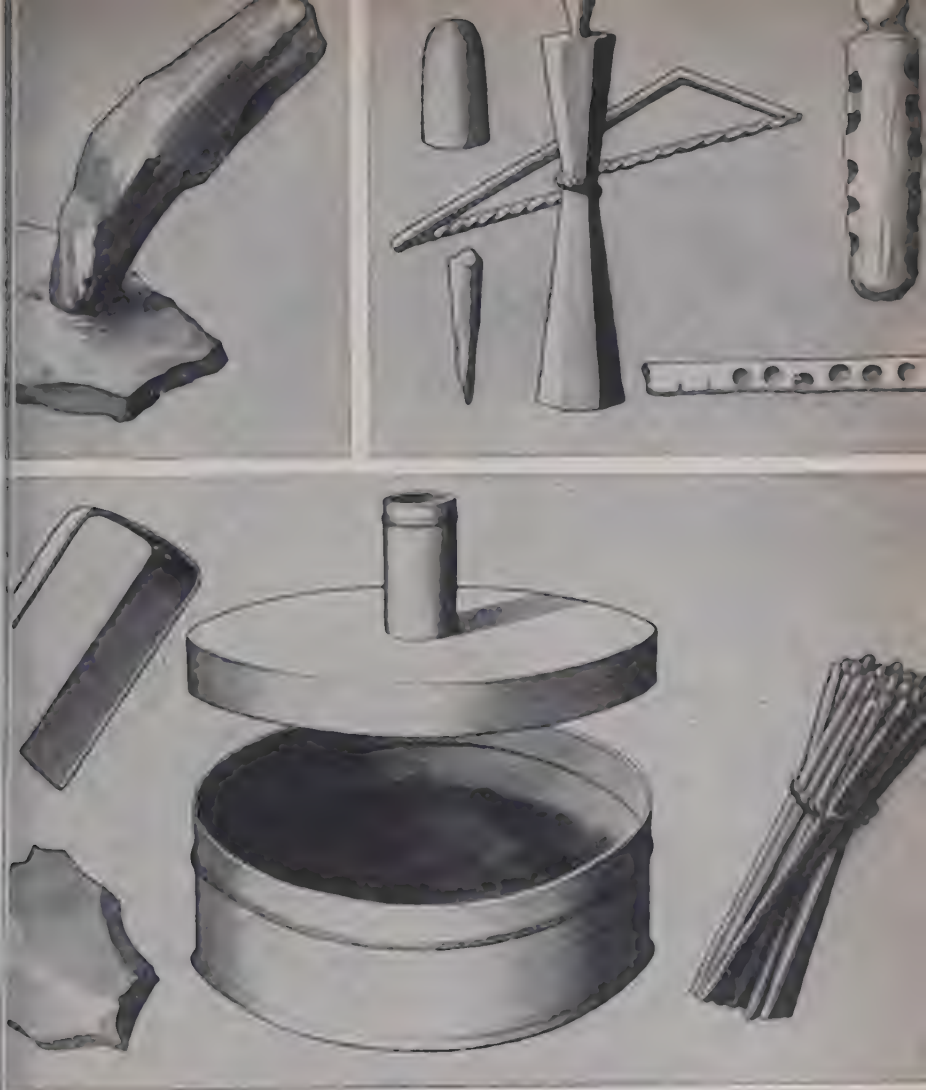
feel them getting warm. Have you proved that rubbing or striking can make heat?

If you rub or strike two pieces of wood together long enough, you can get a flame. If you rub or strike two pieces of stone or metal, you can get a spark. This way of getting a flame or a spark is called *friction*.

But you might make sparks by friction all day and not have a fire. The spark or flame must have something to feed on. It must have wood dust or shavings or dry grass or dry leaves. Such material is called *tinder*. Other kinds of tinder used by the primitive people were dry moss and pine needles. To make a fire by friction, you need a spark or a flame and tinder.

It was a great discovery when men first learned how to make a spark from friction and set fire to tinder. The same idea has been used ever since.

It is hard work making a fire by friction. You have to rub very fast and for a long time. The early men found it was hard to do this with just a stick or a piece of metal held in the hand. So they invented an easier way. They made something called a *fire drill*. In the picture opposite you can see one type of fire drill. Earlier in this story you saw a picture of Boy Scouts using one.



FIRE TOOLS OF OTHER DAYS

Upper left: Iron pyrites. Upper right: An early Egyptian fire drill. See whether you can find out how it works. Bottom: A tinderbox of colonial days in America. At the left of the box are the flint and steel. At the right is the tinder.

There was another easier way of making sparks. Perhaps you have seen "fool's gold." It is a dark, heavy stone, streaked with a yellow metal that looks like gold. This stone is called *iron pyrite*. Sparks can be made quite easily by striking iron pyrites together. This way was used for hundreds of years.

Then the day came when men learned to make steel from iron. After that, they used steel with flint to make the spark that would start the fire.

In colonial days in America every household had its tinderbox. It was kept near the fireplace. The tinderbox held the flint, the piece of steel, and the tinder. There is a picture of a tinderbox on the page before this.

Making Fire in Early Days. Copy each of these statements on your paper. Look at the list of words following the statements. Choose from the list the word or words needed to make each statement complete.

1. Making a flame or a spark by rubbing two objects together is called
2. Dry material used for catching a spark is called
3. Each tinderbox held tinder,, and
4. Iron pyrite is a yellow
5. "Fool's gold" is a nickname for
6. Rubbing two pieces of wood together long enough will make a
7. Striking or rubbing two metals together will make a

8. A person who takes care of a fire is called a

flint	tinder	metal
flame	iron pyrite	spark
friction	fire tender	steel

Reading about Primitive Fire Making. I. If you want to learn more interesting facts about fire making in early days, read the following stories :

The First Days of Man by Frederick A. Kummer

The Story of Fire by Walter Hough

Look in the Table of Contents to find the pages which tell about the coming of fire and about the fire makers.

II. The primitive people often worshiped fire. They thought it was a god. Find the story of Prometheus. It is in *Old Greek Stories* by James Baldwin. This story will tell you what the Greeks thought about fire.

More Experiences with Fire. I. What were some of the things the early people had to learn about fire? How did they learn these things?

II. Plan for a time outdoors when you may have a Boy Scout or a Girl Scout make fire before the class. Why do scouts learn to make fire with a fire drill?

III. Make up an interesting story about a group of early people who lost their fire. Be ready to tell your story to your classmates. Be sure to tell :

1. How the fire was lost.
2. Who was to blame for the loss of fire.
3. What happened when the fire was lost.
4. How the tribe got fire again.
5. What happened to the fire tender.

THE INVENTION OF MATCHES

For thousands of years people had to make fire by friction. Even in colonial days in our own country, people still used tinderboxes. But all the time they wished for an easier way to kindle fire. That meant that they had to think out a way of getting a fire without having to use three different things — flint, steel, and tinder.

At last, men began to work on the invention of a match. A little splinter of soft, dry wood was used for tinder. One end of this splinter was dipped in a material which would burn easily when it grew hot. The head of this match was heated by being rubbed hard on something rough. There would be a spark, and then a flame that would set fire to the stick. This match was invented about a hundred years ago in 1827. It was the best way of making fire that had been invented up to that time, but it did not work very well.

A few years later a much better match was invented. The head of this match was made of something called *phosphorus*. The word *phosphorus* means "light bringer." A little scratch on the phosphorus head made it hot enough to light. We still use phosphorus matches.

Even with a match, you see, we still have to rub to get a spark. That is, we use friction. For this reason, the matches we use today are called *friction matches*.

Matches are very cheap. You can go to a store and buy about one hundred matches for a penny. That is because matches can be made by machines. Things can be made much faster by machines than by hand. For this reason, machine-made articles can be sold for less money.

There are several different ways in which matches are made today. The pictures given in this story show one way. Usually pine or spruce wood is used. The wood is cut into blocks. The blocks are passed through a machine which cuts them into a million tiny pieces, or splints, all exactly the same size. The machine never makes the mistake of cutting one match larger or smaller than its mates. The picture opposite page 170 shows the blocks being fed to the match machine.

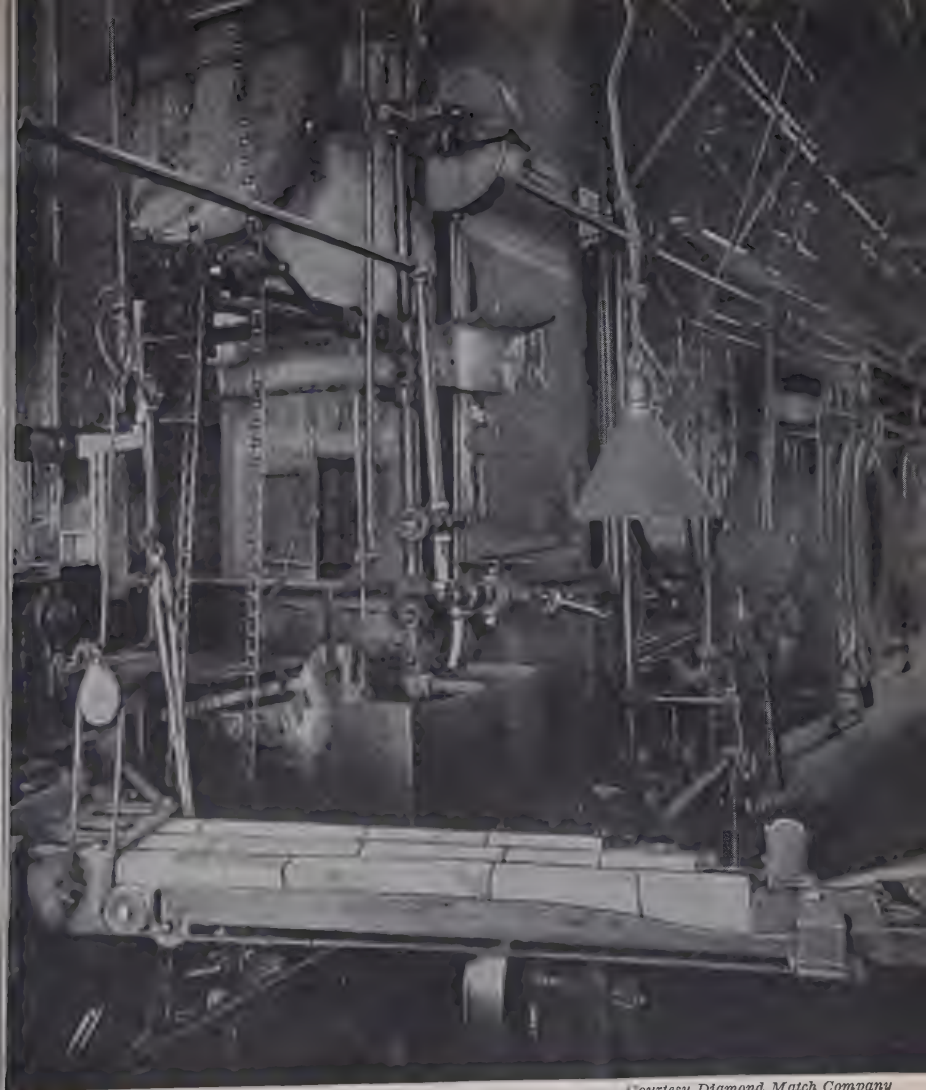
Next, the machine does another wonderful thing. It forces the splints into a million holes in a moving belt. When the splints have all been placed in the holes, they look like bristles on a giant scrubbing brush. Imagine the time it would take if each of these million matches were put into its hole by hand!

The belt in which the splints are placed is a great traveler. It keeps moving, carrying with it the million matches. First, it carries them through a bath of liquid which soaks into the wood and keeps the matches from glowing after they are burned.

After a bath of melted wax, the splints go through two dips to get heads. There is a paste bath. This paste is made of several things. There is phosphorus, which makes the match catch on fire when it is scratched. And there are other materials which help the phosphorus make the spark and which make the spark burn into a flame. Glue is added to make the paste stick to the wood. Coloring matter is put into the paste, too, so that you can see which end of the match to scratch.

It takes about an hour for the match head to dry. During that time the matches keep riding about on their traveling belt. When they are dry, the match stem is dipped into something that keeps it from burning too fast. That is done so that you can hold the match without burning your fingers.

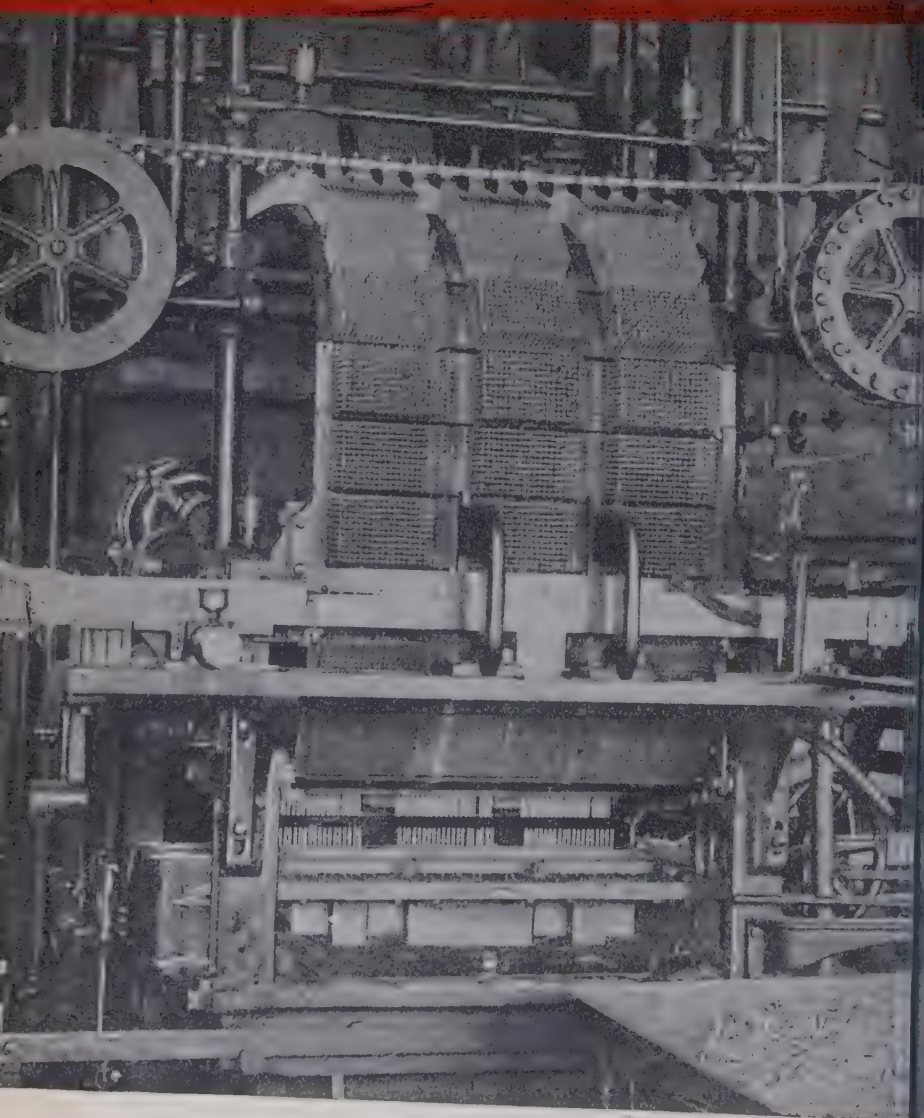
When all these things have been done, the matches are ready to be boxed. The machine pushes them into the boxes from the holes in the moving belt. The pictures on the next three pages show one way of making matches today in a big factory.



Courtesy Diamond Match Company

ONE PART OF THE MATCH MACHINE

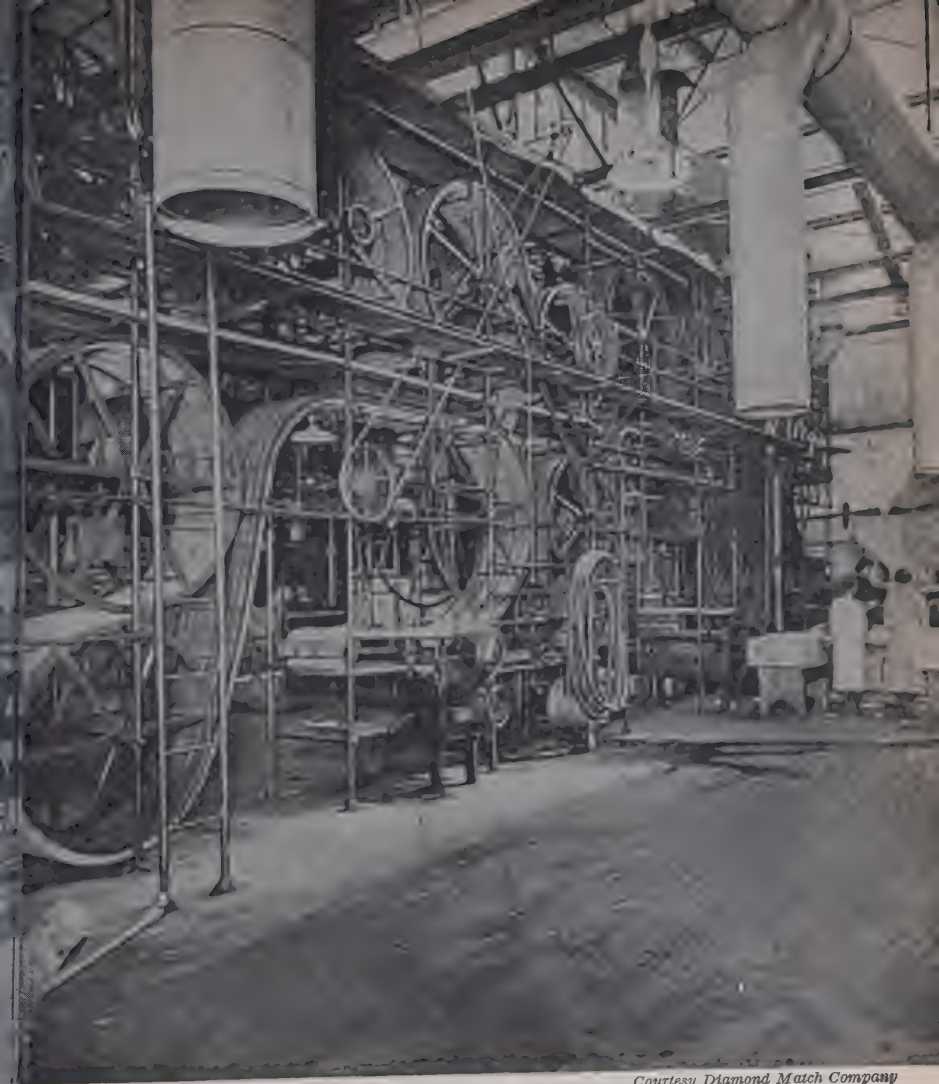
Pine blocks are being fed into a machine which saws them
into tiny splints.



Courtesy Diamond Match Company

THE TRAVELING SPLINTS

Here you see the matches in their moving belts, traveling from one part of the machine to another.



Courtesy Diamond Match Company

IN THE DRYING ROOM

The traveling matches pass around wheel after wheel on their long journey.

The next time you see someone light a match, will you remember how many thousands of years it took for men to learn an easy way of starting a fire?

Some Facts about Matches. I. As you know, matches are very cheap. But if each match should cost as much as a pair of shoes costs, what changes would that make in your way of living?

II. Perhaps the third grade class in your school would like to hear what you have learned about matches and how they are made. You might plan a short program and invite the class to hear it. You could find pictures or make pictures to show each step in the making of matches. Then you could choose someone to tell the story of matches to your guests while someone else shows the pictures.

Plan the story together in class. Be sure that the story tells the parts in their right order. Remember what is done first, what is done second, and so on. Be sure, also, that you know the right names to use for the different parts of the match. How can you explain *moving belt* to your listeners? Could you make a moving belt to show how it works?

III. FIRE, THE COMFORT BRINGER

Primitive people did not know how to use fire to get the greatest amount of help. But the time came when men discovered many ways in which fire could make them more comfortable. By what steps have men learned to use fire?

MOTHER'S NEW GAS RANGE

The new gas range had just come. Mother was proud of it and was explaining its good points. It was as white and smooth as a china plate. It burned gas for fuel, instead of coal or wood. It had an oven for baking and an oven for broiling. The ovens could be easily kept at just the right heat, so that Mother did not have to bother about whether they might get too hot or too cool. There was a little pilot light that lighted the burners, so that Mother didn't have to use a match.

"I wonder what I would have thought if I had been given a stove like that when I went to house-keeping," said Grandmother. "The first one I owned was a black, iron stove. It rusted whenever water was spilled on it. I had to polish it with stove

polish to keep it black and shiny. It had a little door at the side through which I was always having to stick fresh wood. It smoked every time the wind blew, too. If I were in a hurry to have something cooked, I took off one of the lids and set the kettle upon the blaze. But when I did that, I was always sorry, for I had to spend a long time afterwards getting the black soot off the bottom of the kettle. It was hard for me to keep my hands clean when I cooked with such a stove."

"I like my kind of stove better than yours," said Mother. "Mine doesn't smoke. It doesn't blacken my kettles and pans, and it doesn't blacken me. I can prepare some food, place it in the dish in which I am going to serve it, put the dish in the oven, set the thermometer for the right heat, and let the food bake. Then I can take it from the oven and serve it as it is. There is no need for having burned food or food that isn't done; and I never have to add more fuel."

"My grandmother cooked over an open fire in a fireplace," said Grandfather. "She never owned a cookstove in her life — at least, not what we call a cookstove. She was a good cook, too. The fire that she used for her cooking heated the house, also."

"It's surprising to think of the changes that have come in living in the last few years," said Father.

"Here is this wonderful cookstove. In the corner is the new icebox which makes its own ice with the help of a tiny gas flame. In the basement is the furnace which heats our whole house. All of these things have come because people have learned how to use fire so as to make themselves comfortable."

THE STOVE IN PRIMITIVE DAYS

At first, primitive men kept their fires outside their caves. They could not have fires inside the caves because of the smoke. Wood burns with a strong, thick smoke which makes the eyes smart and the throat sting. The early people did not know how to build chimneys to carry off the smoke. They did not even have holes in the roofs of the caves to let out the smoke. You can see how uncomfortable it would have been to have a fire inside.

The fire outside the cave was used for cooking food. It frightened away the wild animals, too, and made the cave a safer place to live in. But it did not make the cave warm.

In time, people learned to make a fuel which would burn without much smoke. This fuel was *charcoal*. Charcoal is wood which has been charred, or partly burned. The wood is heated until it loses much of

the part that makes smoke. We know that the primitive people learned to use charcoal very early, for it has been found in many of the caves they lived in. Using charcoal made it possible for people to have fires inside their caves. The caves no longer needed to be cold and damp. Think how much more comfortable the people must have been !

The primitive people had to learn how to care for their fires inside their caves. The fire had to be kept in a small space. It could not spread all over the cave floor. So the people learned to keep their fire in a hole in the floor. They made a hole three or four feet deep in the center of the cave. Sometimes they lined the hole with stones, but more often the hole had only a dirt lining. The hole was deep enough to keep the fire from scattering around the cave. The fire could be kept alive all the time. Using the *fire hole* was the first step toward inventing the stove.

Next, the people learned that they needed a place to put their kettles while the food was cooking. So they put a few stones in the fire hole. When these stones became very hot, the people set their jars or bowls of food on the stones to cook. The bowls stood close to the coals but did not rest on the fire itself. These stones took the place of the *stove top*

which we have today. Using hot stones was the second step toward inventing a stove.

Primitive people learned that meat could be broiled right over the fire. It did not need to be cooked in a jar or bowl. So they next improved the fire hole by making a grate to lay over it. They placed green twigs crisscross over the top of the hole. Then they laid their meat or fish upon these twigs to cook. Such a way of cooking is called broiling. The grate for broiling which primitive men made was the first *broiler*.

Many years later, people learned to make an *oven*. They dug a hole in the floor and lined it with stones. In this hole they also placed fire and fuel. When the lining of the hole was very hot, they took out the fire. Then they put the food into the hole and covered the hole tightly. The hot stones of the earth oven held the heat and baked the food. Making an earth oven was the next step toward inventing the stove.

The stove we use for cooking today has five important parts. It has: (1) a *firebox* that holds the fire or flames; (2) a *stove top* that holds the kettles for cooking; (3) a *grate*, or *broiler*, on which we broil food; (4) an *oven* for baking food; and (5) a *draft* that sends air to the fire.

Fire will not burn at all unless it has some air. The *draft* sends a current of air over the fire and makes the fire burn with a quicker, hotter flame. A current of air passes into one of our stoves or furnaces through a small door or open grate near the firebox. It passes through the fire and out through the chimney. As fast as it goes out through the chimney, more air comes in through the door or grate to feed the flame.

The primitive people invented all parts of the stove except the draft. They discovered that their fires burned better when they piled the fuel loosely, but they did not know why. It took people a long time to learn how to make a better draft.

The cook had to sit or kneel on the floor whenever she needed to tend the food. This was such hard work that people finally learned to build a platform of stone, or a hearth, to hold the fire. In this way they made a sort of fireplace. The hearth could be built up as high above the level of the floor as the people wanted it. When stoves were made later on, they were placed on legs so as to be easier to use for cooking.

The Importance of Charcoal. Look up *Charcoal* in the encyclopedia. Read what it tells about how charcoal is made. How did primitive people discover the

making of charcoal? Explain why the making and using of charcoal was of great importance to primitive people.

We do not often use charcoal in the stoves and furnaces of today. Why do we not need to do so?

Cookstoves of Today and Long Ago. I. Look at the cookstove in your home. Read again the list that tells the five important parts of a cookstove (see page 179). Find each of these parts in your cookstove.

II. Find or draw a picture of a cookstove. Mark each of the five important parts with its name. Then draw a primitive cookstove as you imagine it looked. Mark on your picture each of the four parts that the primitive people knew about. What important part did you mark in the stove of today that you did not mark in the stove of long ago?

Primitive Inventions. As you have seen, the primitive people were great inventors.

Make a list of the great primitive inventions which you have read about so far. Opposite each name of an invention, tell in what way the invention changed the ways in which primitive people lived.

IMPROVING THE FIREPLACE

One of the biggest problems the early people had was getting rid of smoke. They must have suffered much from smoke, for even charcoal has some smoke and smell. After people began to live in tents and houses instead of in caves, they learned to leave holes in the roofs to let the smoke out. How much more

comfortable the people must have been then! But for centuries there were no chimneys -- only holes in the roofs over the fires. Even in the castles of the wealthy noblemen the smoke was let out through holes in the roof.

The time came when the fire was moved to one side of the room. Then it was found that a piece of metal, placed like a hood over the fire, helped the smoke find its way to the hole in the roof. The people found that the hood made the fire burn better, too, because it gave the fire a better draft of air. After a while, a hollowed-out place in the wall was made for the fire. Then a passageway to the roof was built for the smoke. That led the way to real chimneys and real fireplaces like those we have in many houses today. But it was only about seven or eight hundred years ago, in England, that the first chimneys were built.

When the first people came to America from Europe, they heated their houses with fireplaces. At first they made their fireplaces of green logs covered with mud or clay. Later they made them of stone, and finally of brick.

The picture on the opposite page shows you one of these early colonial fireplaces made of brick. It is the kind of fireplace spoken of by Grandfather



A BUSY COLONIAL KITCHEN

on page 176. These fireplaces used a great amount of wood. But wood was plentiful then, and the people were only too glad to have it burned up.

The early settlers made their fireplaces large for two reasons. One reason was that they needed the heat. The other reason was that it was hard to cut the wood into small pieces. In those great fireplaces whole logs could be burned with very little cutting. A tree was chopped down, the branches stripped off, and the trunk cut into several large pieces. A horse was used to haul a piece of log to the house. Then the men dragged it into the kitchen and pushed it into place at the back of the fireplace. In front of this log a small, hot fire was built. This fire had to be fed often. But the big log at the back burned slowly and gave out heat for days.

The people did not keep warm though, even with such fireplaces as these. A fireplace is a poor way to heat a room. Much of the heat goes up the chimney. The rest does not spread to all parts of the room. Those sitting near the fire are too hot. Those sitting far away from the fire are too cold.

But the fireplaces were well furnished for cooking. Copper, brass, and iron pans and kettles hung at the sides, or stood on the hearth ready to be used. Metal arms, or cranes, stretched out over the fire.

Pot hooks hung by long chains from these cranes. If the cook wanted the pot to cook slowly, she hung it high up on the chain, away from the hottest flames. If she wanted it to boil rapidly, she hung it far down on the chain, near the fire.

At one side of the chimney was the oven. It was built of brick. This oven was heated by means of a fire built inside. The fire was left in the oven until the bricks were hot. Then it was raked out, the food was placed inside, and the oven was closed tightly. The heat from the bricks did the baking.

The Problem of Smoke. Smoke has always been a great problem in heating and cooking. Think over the steps people have taken to solve this problem. Be ready to tell the story of how people gradually learned to solve it. Be sure you have the steps in the right order. Be sure, too, that your facts are correct. Choose one of these ways of telling the story:

1. Write a short story which you might call "Getting Rid of Smoke."
2. Make a set of pictures that show the steps by which men have learned to rid their houses of smoke.

Improving Fireplaces. I. Find pictures showing different kinds of fireplaces. Try to get pictures showing: (1) fireplaces of different sizes and shapes; (2) fireplaces made of different materials; and (3) fireplaces with different kinds of decorations.

II. In the early days of our country, fireplaces were very large. Now most of the fireplaces we see are quite small. Give a good reason for the difference in size.

III. Find a picture that shows a fireplace which was made by an early American settler. Try to get a picture that shows the kinds of cooking utensils the settler used and the kind of fuel he had in the fireplace.

Small Ovens and Large Ones. Perhaps you are interested in ovens. Ovens are very different in shape and size and in the ways they are heated. Begin a collection of pictures for a scrapbook. Find pictures showing as many different kinds of ovens as you can. You will be surprised at the size of some of the ovens used in bakeries.

INVENTING MOVABLE STOVES

Before chimneys were built, most houses had fires in only one or two rooms. The people of Greece thought of a way to warm any room.

Greece is a country in southern Europe. It never gets very cold there. The Greeks did not need large fires to make their rooms warm. So the Greeks thought out a very small stove. It was a metal fire pan, called a *brazier*, in which charcoal was burned. The brazier stood upon legs. Sometimes it had a handle by which it could be carried about and taken to any room in the house. You can see what one of these Greek braziers looked like in the picture on the opposite page.



A GREEK BRAZIER

The people of Rome used braziers, too. But they made a deeper brazier. They divided the firebox into an upper part and a lower part, so that there was a place for the ashes to drop.

Perhaps you will be surprised to know that the people of Rome had furnaces, too. Some of the Romans heated their whole houses with hot air, as we do today. The firebox of the furnace was sometimes outside the house and sometimes in the basement. Clay or tile pipes carried the heated air from the firebox. The pipes ran under the floors and between the walls of the room which was to be heated. Little openings in the walls and the floor let the hot air out of the pipes and into the room. The only trouble was that smoke was let into the room, too. The Romans had not discovered a way of drawing off the smoke.

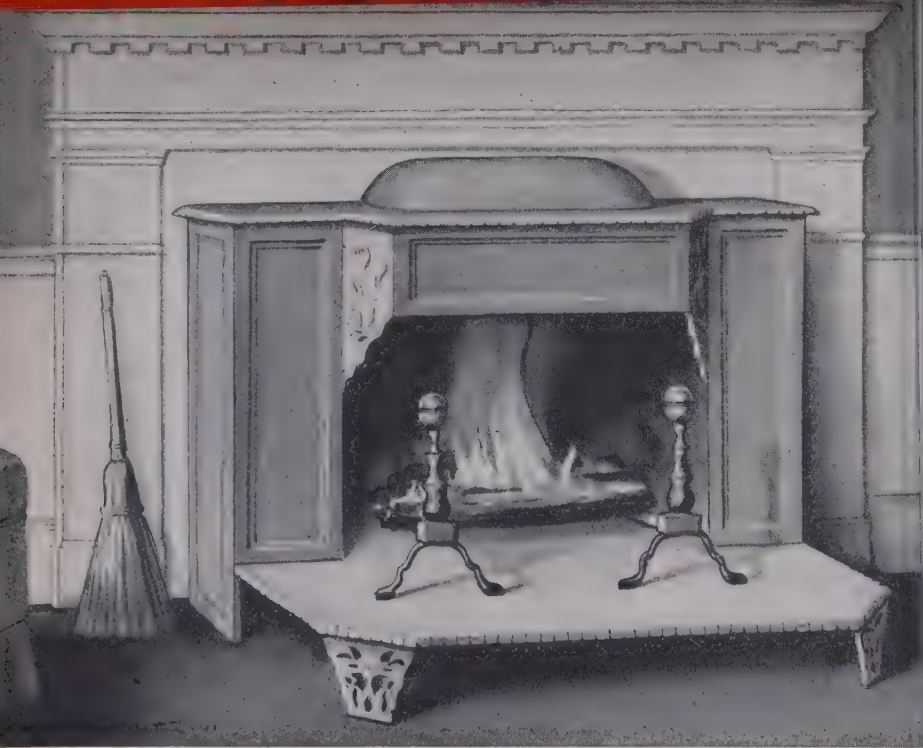
The first real stoves were not made until after chimneys were built. These stoves looked much like braziers. They had flat tops on which dishes of food could be put to cook. The smoke was let out through openings in the top that could be connected with the chimney by a pipe.

Many of the early stoves were made of porcelain, or china. Some were made of tile. Some of the early stoves were very beautiful. Many of them

were so large that they reached to the top of the room. The firebox in this kind of stove was small, but the outside surface was so large that it easily heated the room.

As you have read, the early settlers in America used fireplaces to heat their houses. In the later days of the colonies, stoves could be bought. But they cost a great deal, and few people had them. The first stove sold in America was square and was made of metal. It was placed in the room in such a way that the stove formed a part of the wall. Three sides of the stove were in the room, but the fourth side was outdoors. This fourth side was the one through which fuel was put on the fire. For that reason, whenever the fire needed more fuel, someone had to go outdoors to feed it. You can imagine what an inconvenient kind of stove that was.

Benjamin Franklin, who lived in America during this time, decided that the people needed a good stove. He read and studied until he learned many things about drafts and fuel. He made the best stove that had been made up to that time. It was a stove that could be placed in any room. It was made of iron. It did not use too much fuel. It was connected to the chimney, so that there was a way of letting out smoke. This stove looked a great



THE FRANKLIN STOVE

The earliest Franklin stove fitted into the fireplace. But it gave out more heat because it stood out into the room.

deal like a fireplace, as you can see in the picture above on this page.

The Franklin stove brought much comfort to the people of the country. As time went on, other kinds of stoves were made. But probably none was greeted with more joy than was the Franklin stove.

Now most people heat their houses by using furnaces. You have seen how the stove grew out of

the early fire hole. In the same way, the furnace grew out of the stove. A furnace is just a huge stove.

There is only one thing that makes a furnace different from a stove. A stove is usually placed in the room it is to heat, and it heats only the air of that room. A furnace is placed in a basement or in some central part of the house, and it heats the whole house. Some furnaces heat air, while others heat water or make steam from the water. The hot air or the hot water or the steam is piped into the rooms. In this way, the heat does not come directly from the furnace itself. It comes from the air or the water or the steam which has been heated by the furnace.

In some places people do not have either stoves or furnaces in their houses. There is a special heating plant in their town, and heat is piped into the houses from this heating plant, just as water is piped in from a faraway water station.

Perhaps by the time your children are in school, all houses will be heated from a heating plant. Your children may read about our furnaces and think them quite old-fashioned, just as you now think the brazier and the fireplace are old-fashioned.

As stoves have changed, different kinds of fuel have become important. For many years wood and charcoal were the chief fuels. Now coal is used more

than any other fuel. Coal makes a hotter, steadier fire than wood.

Oil is becoming more and more important as a fuel. It is used in furnaces in many buildings and homes. Many ships burn oil because it is easier to carry than coal. And fewer men are needed to care for the fires on a ship which burns oil for fuel.

Gas and electricity are important fuels today, too. Gas is used for heating buildings in some parts of our country. Some people use electricity for heating. Gas and electricity have become the leading fuels for cooking. Of course, a great many people still use coal and wood for cooking.

How Heat Travels. Long ago primitive people used only one fire to heat the cave home. They could do this because the cave was small and there was only one room. Later, when houses were larger, a fire built in one room could not heat the other rooms. Someone invented a movable stove which could be carried from room to room, wherever it was needed. But sometimes people wanted to use more than one room at a time. One fire was not enough. Then people put a stove into each room.

But today most of our houses, and even our largest houses — the apartment houses — are heated once more with only one fire. How is it that *one* fire can heat a house or building large enough to hold hundreds of people? Find what the encyclopedia tells about furnaces. Look under the topic *Heating* or *Heating and ventilating*.

Stoves of Long Ago and Now. I. See whether you can find enough pictures of different kinds of stoves so that you can put them together in the right order to give a picture history of the stove.

II. You will probably enjoy reading stories about famous stoves. Find these books:

The Nürnberg Stove by Louise de la Ramée

Boys and Girls of Colonial Days by Carolyn Sherwin Bailey

In this second book, look in the Table of Contents for the story called "The Iron Stove."

Ways of Heating Used in Other Countries. People in different parts of the world today have different ways of heating their houses. What are some of these ways? Can you find pictures that will answer this question? Can you find stories that will tell you of different methods of heating houses? What are some of the ways used in Ireland; in Greenland; in Italy; in China; in Japan; and in Korea?

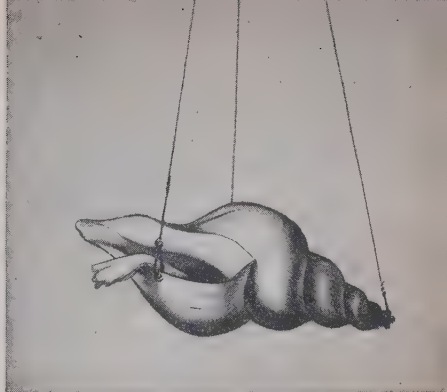
IMPROVING WAYS OF LIGHTING

Natural light is the light of the sun, the moon, or the stars. *Artificial light* is a light made by man. At first, men had no artificial light except the light of their fires. Later, they learned to make a torch by lighting a long stick of wood at one end. The torch smoked and made the people's eyes and throats hurt. But for thousands of years the torch was the chief way of lighting.

The lamp was probably the next artificial light to be made. Perhaps a woman preparing a meal watched the fat dropping from the meat which was cooking over an open fire. She noticed that the fat burned with a bright light. Then she began to save the fat that dropped from the animals which she cooked. She caught this grease in shallow dishes, made from hollow stones or gourds, or in clay bowls. At night, when the family were gathered in the cave, she lighted these bowls of grease and in this way invented the first lamp. How happy the primitive people must have been to have a light that could be carried about and that made less smoke than the torches they had used!

Later, the wick was invented. Probably it was discovered by accident. A string or greasy rag may have been hanging over the side of a grease lamp. It may have caught on fire and burned with a bright light and a steady flame. But wonder of wonders! It did not set the oil on fire, and it did not burn up for a long time. The wick burned slowly, for the oil soaked into it little by little. From that time on, the early people put a piece of string into the bowl or saucer of oil and used this lamp as the chief way of lighting. The pictures opposite show how the wick was used, first in shallow holders, then in candles and lamps.

Shells were often used as lamps by the primitive peoples.



Candles came to be used widely after people had enough flocks and herds to supply plenty of tallow.



Argand's inventions made the wick lamps better than they had ever been.



The next important idea about lighting came when people began to let the grease harden around a wick. They found that as the wick burned, the flame would melt only the part of the hardened grease that was at the top. When they learned this, they began to make candles.

The people of an old country called Phoenicia were among the first to make candles. Phoenicia was along the eastern coast of the Mediterranean Sea. The Phoenicians learned to make candles from the wax of the honeybee and from the wax of certain berries. But this wax was hard to get, and wax candles were not used much. Then a cheaper grease called *tallow* was found. Tallow was the fat of cattle and sheep. Very good candles could be made from tallow. People began to use them everywhere.

Men used the torch, the grease lamp, the wick lamp, and the candle for thousands of years. All of them smoked and smelled and gave only a dim light. People knew that these ways of lighting were not good, and they tried to think of better ways. They could not make much change in the torch or in the candle. But they did try to change their lamps. They changed the shape. They changed the wick. They tried different kinds of oils. But the lamps kept right on smoking.

At last, a Swiss engineer by the name of Argand had a good idea about lamps. "A lamp would not smoke," he thought, "if it had a hotter flame. A hotter flame will burn up all those tiny flakes of unburned fat that make the smoke. I can get a hotter flame if I can give the lamp more draft."

Argand did two things to get the draft he wanted. He had a round wick, like a tube, in place of the flat wick that had been used before that time. The air passed through the hollow wick and made the flame bigger. Then he put a glass chimney on the lamp. Air could pass in at the bottom of the chimney, through the flame, and out at the top. With such a good draft the lamp did not smoke. An Argand lamp is shown in the pictures opposite page 194.

In a very short time men discovered a new oil that came out of the ground. From this they made coal oil, or kerosene. It burned better than the oil that people had been using. With the new coal oil the Argand lamp became the best light that men had ever had.

Then another change came when people learned about gas. Men worked hard to invent a lamp that would burn gas. At last a good gas-burning lamp was made, but few people would use it. They were afraid of gas. They were not willing to change from

the coal-oil lamps and tallow candles which they had always used.

Gas was used for street lights before it was used much for lighting houses. At first only a few cities used it. Then more cities began to light their streets and public buildings with it. Gas was piped into houses and apartment buildings. People became less afraid of gas as they learned more about it. Before long, gas was used in many places. But soon a better way of lighting was found. Now gas is used chiefly for cooking and heating, though there are some places where it is still used for lighting.

The new light was the light made by electricity. Men worked many years before they finally made a good electric light. When it was finished, it was the work of many inventors. Now you can light a room by just pressing an electric button. Electric light is brighter than any other light.

Until the electric light was invented, all artificial light had come from fire. Turn back to the pictures opposite page 194. These pictures show you three important steps in the story of lighting by fire. What steps are not shown?

Lighting by fire lasted thousands of years. It is still used in many places. But, more and more, electric lighting is taking its place. The electric light

is not fire, although it gives off heat. Sometime you will want to read the story of electricity and the electric light. You will find that fire plays a part in the making of electric power.

Kinds of Lights. Divide your paper into two columns. At the top of the first column write "Natural Lights." At the top of the second column write "Artificial Lights." In the first column list all the different natural lights you know about. In the second column list all the different artificial lights. Put a star beside the name of the very best kind of light that man has ever made.

Making Candles. I. Find a picture showing how the people of long ago made their candles.

II. Have you ever dipped candles? Find out all you can about making candles. The book *America's Roots in the Past*, by Daniel J. and Dorothea Beeby, tells how the early settlers of America made candles. Look in the Index to see what pages tell about candle making. Perhaps you can make some candles as Christmas gifts. What would you need for this work?

III. Today we buy our candles. We use candles to decorate a room and to make a soft light in the room. But we seldom try to read by candlelight. Why? Who makes the candles we buy? How are they made? Find out and tell the class.

Inventing Lamps. I. Make a picture that will show people using the first lamp that was ever made. Make a picture showing primitive people using torches.

II. Write a story about how the smokeless lamp was invented. You will want to tell about each of these topics :

1. Why the early lamps smoked.
2. What were the different ways people tried to get rid of the smoke and the smell.
3. How a smokeless lamp was finally invented.

The Lighting of Today. What are the different ways we have today of lighting our houses and streets? Which is the safest method of lighting? Which is the most convenient? Which method gives the best light? Look in your encyclopedia for information. Look under the topic *Light*. If you do not find all the information you need under that topic, look under *Electric lighting, Gas, Lamps, and Lighting*.

IV. FIRE, THE WORKER

Men were not satisfied to use fire merely to make themselves more comfortable. As time went on, they learned that fire was able to do still more for them. They made fire their chief servant. They made fire help them earn a living. It took them hundreds of years to do this. How did they do it?

FIRE AND CLAY

Primitive men found many useful things all about them. There were stones and sticks and sand and clay. There were plants and animals. The rivers and the sea were filled with fish, and the air was filled with birds. Great tall trees covered much of the ground. Underneath the grass were iron and copper, gold and silver, coal and oil.

At first, the primitive people used only the things that they could see — the things that lay on top of the ground. They used them just as they found them. They did not make changes in them because they did not know how. After a long, long time they began to change these gifts in order to make them more useful.

We do not know exactly how men first began to change things. But we do know that they began very early to use fire. They used it to change the shape and color of metals. They used it to change soft materials, like clay, into hard ones. They used it to melt hard materials, like iron.

It was a great step when primitive people began to change the things that were about them. It was the first great step in becoming civilized.

One of the first things that the primitive people made with the help of fire was pottery. Clay, which is just one kind of soil, lay all about them. It was soft and easy to handle. It was fun to shape it and to play with it. It was a great discovery when people found that they could shape clay to make dishes and jars for use. It was a greater discovery when they found that they could bake clay in the hot coals and make it fireproof and waterproof.

We do not know how primitive men learned this use of fire. It could have happened in a number of ways. Perhaps some girl lined a basket with clay. Perhaps the basket caught on fire. The grasses and vines from which it was woven burned away. But the clay lining was there! It was baked hard. It was a different color from the dried clay. It would hold water. Instead of a basket, the girl had an

earthen bowl which was fireproof and waterproof — perhaps the first one ever made.

Or, perhaps a group of people moved their fire to another spot. Then they found that the earth around the old fire hole was hard. Water poured into the hole would not soak into the ground. The dirt had become hard as stone. Perhaps that was the way people discovered what fire would do to clay.

Perhaps a group of people made clay bowls for storing their food. They baked these bowls hard in the sun. They stored the bowls in the cave among some dry branches and leaves. Maybe the branches caught fire, and the bowls were baked in the hot flames. "They are ruined," the owners thought at first. Later, they discovered that the clay bowls were much better bowls than before the fire had baked them. They no longer became soft when they were wet.

In such ways as these, primitive men must have discovered that fire could be used to make clay fireproof and waterproof. This discovery meant that men could have better dishes. It meant that primitive people had discovered how to change clay. They could go on making better things from clay. On the next page you will see a picture of early potters at work.



EARLY POTTERS

How did these early potters use fire to help them? What do you think each man in this picture is doing?

Now we use clay to make dishes, lamps, and containers of all sorts. We make bricks, toys, tiles, bathtubs, and sinks from clay. One of the important kinds of work in the United States of America is the making of pottery. Fire is still used for baking the clay. But now men know better how to use fire than primitive men did.

Today, when clay dishes or tiles are ready for "firing," they are placed in huge brick ovens. When the oven is full, the doorway is bricked up and plastered over with clay so that it is perfectly airtight. A fire is placed underneath the oven. When it reaches the right temperature, it is kept that way for two days or more.

After the pottery has baked long enough, the fire is put out. The oven becomes cool, and the pottery is taken out. Then the bowls or tiles are decorated. Some are colored, and some are painted with designs. Then a hard kind of varnish, or *glaze*, is put over them. After the glaze is put on, they are given a second baking.

You see we still make things from clay and bake them in the fire as the primitive people did. Our ovens are better than theirs. Our ways of using clay are better than theirs. You can see a pottery oven of today on the next page. But the making of



Courtesy Onondaga Pottery Company

A GREAT OVEN IN A POTTERY OF TODAY

An oven in a great pottery is called a kiln. In this picture, men are placing pieces of pottery in a kiln to be baked, or fired, as we say.

pottery is the same kind of task that it was thousands of years ago.

Some Facts about Containers. See whether you can answer the following questions :

1. What did people use for containers before they learned to make fireproof and waterproof bowls?
2. What are some of the ways in which primitive people probably learned to shape dishes out of clay?
3. In what ways did learning to make containers from clay help primitive people to become civilized?
4. How is our way of making dishes the same as that used by primitive people?
5. Name some of the containers we use today which are made from clay or sand with the help of fire.

Finding the Answer. Why is it hard to make beautiful bowls? Try making a bowl yourself. Shape the bowl from clay. Then let it dry several days. When it is dry, place it in a can and cover it. Put the can in the furnace or fireplace to bake. After it has been in the fire for several hours, take it out. Be sure to let it cool slowly. If you don't, it will break.

Something to Read. The book *The First Days of Man*, by Frederick A. Kummer, has an interesting story about some of the troubles of a potter. Look in the Table of Contents to find the chapter called "Tor-Ad the Potter."

Bricks and Tiles. How are bricks and tiles made? The book *The Houses We Live In* by Frances Carpenter will tell you.

FIRE AND METALS

For thousands of years the primitive people made tools and weapons from things they could find easily — wood and stone and the bones of animals. They had not yet learned to hunt for things to use. They never dreamed of the great wealth that lay hidden beneath the ground at their feet.

But, in time, men began to notice differences in the rocks about them. They noticed that some were streaked with bright colors and strange spots. They began to pay attention to those rocks that looked different and felt different, and which were heavier even than the stones.

They began to handle those rocks containing the bright streaks and strange lumps. In handling them, they learned important things. Those were the rocks containing metals.

They learned that when they put rocks like these into their fire holes, strange things happened. The heat separated the metal from the rocks. Do you know why? It was really very simple. As the rocks became hot, the metal in them melted. Then it ran out of the holes and cracks where it had been hidden for ages. It ran down the sides on to the ground. But the rocks stayed hard. In this way primitive men learned to gather metal for their use.

They found out other things about these metals, too. They found that some of the lumps of metal could be hammered into new shapes and forms. They discovered that metals had to be heated before they could be hammered. They found also that they could melt the metals and place them in molds. When the metals had cooled off, they were in the form of the mold. Primitive men had learned how to change metals and to become craftsmen.

Wonderful new knowledge! When primitive men learned these things, they were able to make progress faster than ever before. They could make knives with keen, sharp edges — far sharper than their knives of stone. They could make tools — strong, wonderful tools — better than any ever made before.

Many people think that copper was the metal that primitive people first learned to use. Perhaps the bright color of the metal attracted their attention. Or perhaps they happened to build a fire on a rock containing copper and watched with amazement as the bright metal ran down the sides of the rock. At any rate, men learned early to catch the melting copper in a container and to harden it into a lump. They learned early to hammer this lump of precious metal into knives and spears and battle-axes. And they learned early to sell these weapons.

Later, tin was discovered. At first, tin did not seem very useful. But as time went on, men found that melted copper mixed with melted tin made a hard material that is called *bronze*. With bronze they made the best weapons and tools that had ever been made. Bronze was hard enough to hold a sharp edge. It was very strong.

Then men discovered iron, and they made still better tools and weapons. From iron they learned to make steel, which is the hardest and strongest of all the common metals.

All this time people were learning to do new kinds of work. Men working in metals were among the most important workers of the world. They were called *smiths*. There were smiths who made tools for farmers, for weavers, and for carpenters. They gave these workers better tools than they had ever had. There were smiths who made better weapons for hunters and for soldiers. There were coppersmiths who made bowls and jugs and jars. There were goldsmiths and silversmiths who made beautiful jewelry and costly dishes.

A smith did all his work with the help of fire. He had a *forge*, or fireplace, for heating his metal. With his foot, he worked a skin bellows which blew a stream of air over his fire to make it hotter. When

the metal was hot, he picked it up with tongs. Then he put it on a metal block, or *anvil*, and hammered it into shape.

With the tools that the smiths made, the ancient people were able to saw down trees and cut them into boards. They were able to make ships and buildings. They were able to make beautiful cloth, furniture, and glassware. They could do these things because men had learned to use metals and to use fire.

We still have smiths. Perhaps you have seen a blacksmith like the one on the next page, at some roadside, hammering iron into horseshoes. In great factories where tools and machines are made, a machine is often used to do the hammering. Often, too, our metals are worked today without hammering. We have mills and foundries where metal is melted and poured into molds to make the things we need. A scene in a steel mill is shown opposite the blacksmith's picture.

Today we depend upon the metals and upon fire much more than men did in the early days. From metals and fire we make most of the machinery used in the United States. We use machines for making our clothing and many of our foods. We use machines for making our newspapers, our books, our toys, and our musical instruments. We use machines



A BLACKSMITH'S SHOP

Philip D. Gendreau



Courtesy Bethlehem Steel Company

IN A GREAT STEEL MILL

for making our moving pictures, our radio sets, our telephones and telegraph instruments. We use machines for making the railroad tracks on which we travel, and the trains, buses, and automobiles in which we ride. We use machines for making our buildings, our bridges, and our roads. There are few things we have that are not made by machinery.

The Discovery of Metals. Why did the early people probably learn to use stone before they learned to use metals? Talk over this question.

The Mining of Metals. Choose one of these metals: (1) gold; (2) copper; (3) iron; (4) tin. Find out how that metal is mined, and how it is prepared for use. Tell the class about the metal you choose, and use pictures to make your talk more interesting.

The Making of Steel. Look in the Index of your geographies and find the topic *Steel* or *Iron*. Then turn to the pages listed and read to find out how steel is made, where it is made, and for what it is used.

The Importance of Copper and Iron. Copper and iron have helped to make people civilized. How?

Stories to Read. Below and on page 215 are two books which will tell you more about the discovery and use of metals:

Dan-Hur and the First Farmers by William L. Nida

Look in the Table of Contents for the chapters that tell about finding gold and discovering copper.

Inventions and Discoveries of Ancient Times by William L. Nida

Look in the Table of Contents for the chapters called "The Hottest Fire in the World" and "Iron Brings a New Age."

FIRE, THE POWER MAKER

Fire is used not only in making machines but also in running many of them. Fire is used to run some engines. The power from these engines makes the other machines work.

We have not had engines very long. For thousands and thousands of years men did all their work with their hands. Then they taught animals to help them work. Later still, they used the running water of streams to turn the wheels of mills and factories that made things for men to use. They used the wind to turn their wheels, too, and to speed their boats over the seas. Besides their own hands, animals and water power and wind power were the only helps men had for hundreds of years — or for *centuries*, as we say.

During those centuries men were always wishing for better help in doing work. Surely they could find better helpers than the straining muscles of men and beasts! Surely they could find better servants than

running water and blowing winds! Yet time went on — centuries and centuries of time — and nothing better was found.

Then at last, men learned about a new kind of power — the *power in steam*.

You have watched water boiling on the stove. You have seen the bubbles rise to the top and break, letting a cloud of steam float off in the air. You have seen steam pour from the kettle spout, or move the kettle lid up and down, up and down. What makes the lid move? It is steam pushing against the lid, trying to escape from the kettle.

When water becomes very hot, it boils. Part of the water is turned into steam. Steam fills much more space than the water from which it comes. It must go somewhere. It fills the kettle. It pushes and pushes. It comes out of the spout. It pushes up the lid and tries to get out that way. The steam has strong pressure. It can work. It has *power*.

When men discovered that steam has power to lift and to pull and to push, they tried many times to invent some kind of engine that would put steam to work. But it was not until about two hundred years ago that they were able to do this. The picture opposite shows two ways they found of putting steam to work.



A MODEL OF AN EARLY STEAMBOAT AND AN EARLY TRAIN

The very first steam engines that were made were clumsy. They were not very powerful. They wasted fuel. It was not until 1769 that James Watt, who lived in Scotland, invented a much better steam engine. After that, engines were improved until they became as perfect as men could make them.

After James Watt had made his first good engine, people began to use steam engines for all kinds of work. They were placed in ships to move the paddles. They were placed in locomotives to move the trains. They were used in mines to pump out water. They were placed in factories to turn wheels and make machines work. They were placed in sawmills, in dredging machines, in threshing machines, and in furnaces. Today much of the work of the world is done by engines. Much of it is done by steam engines. These engines are made to use steam — to make steam work.

Steam is made by heating water until it boils. Fire makes the water boil. Fire makes steam. Steam runs engines that run many of the machines. Steam is used in making the electricity that runs many other machines. Fire is the great Power Maker. It takes *power* to do the great work of the world, steam power or electric power. On the opposite page you see a locomotive of today run by steam power.



Philip D. Gendreau

A STEAM LOCOMOTIVE OF TODAY

The Power of Steam. I. Choose one of the topics from the list below. Look in your geographies, histories, or other books for interesting facts about that topic. Be ready to tell the class what you find out.

1. How James Watt invented a steam engine.
2. How a steam engine works.
3. Who made the first steamboat.
4. Who invented the first locomotive.
5. How engines are used for sawmills.
6. How engines are used in factories.
7. How the use of steam engines improved the speed of ships.
8. The differences between steam locomotives of today and the first locomotives run by steam.

II. Find pictures of different kinds of steam engines. Write a title for each picture telling the work that each kind of engine does.

III. List all the different kinds of work you know of that can be done by steam engines.

How the Automobile Runs. The gasoline engine made the automobile possible. Find out why the steam engine could not be used for automobiles.

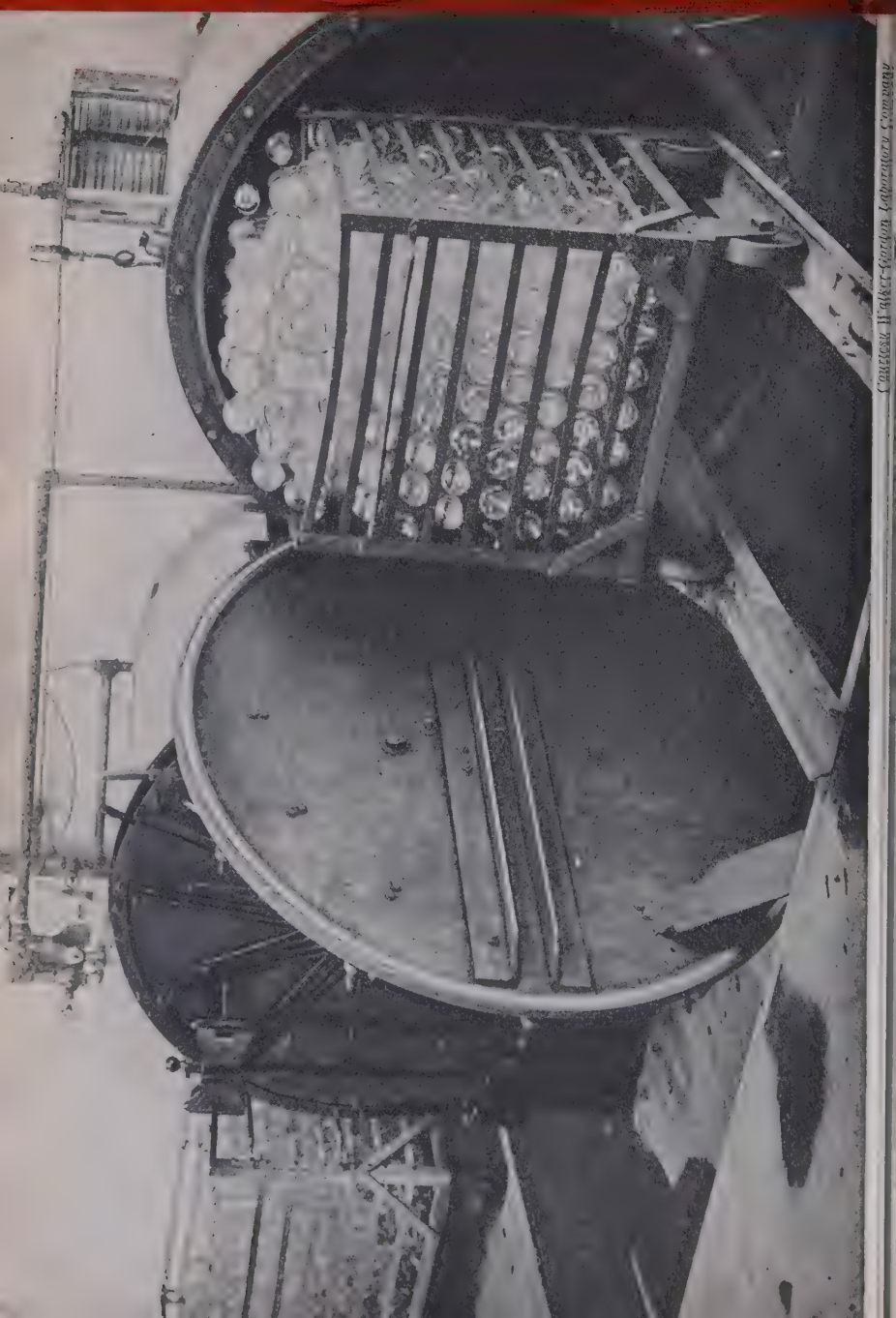
How Furnaces Run Engines. Find pictures of great furnaces that make heat to run engines. Some of these furnaces make heat to furnish steam. Some of them furnish power to make electricity. Some of them will be furnaces on ships, on railroads, or in factories. Under each picture write a title that tells what kind of work the fire helps to do.

FIRE, THE PROTECTOR

Fire helps in still another kind of work. Only in the last few years have we found out how fire may help us keep things pure and clean. All about us — in the air, in our food and water, on all the things we touch — are tiny living things called *bacteria*. Many bacteria are helpful, but others cause sickness. Sometimes people have typhoid fever because they drink water or milk that has harmful bacteria in it. We call the harmful bacteria *germs*.

It is hard to kill germs. They are so small that we cannot see them without the help of a very powerful glass called a microscope. But we know that they are present in a good many things, and we do all we can to get rid of them. Fire can help us.

Heat is the deadly enemy of bacteria. Those tiny living things cannot live if they are boiled or baked or steamed. That is why milk bottles are boiled or steamed so as to make them safe and clean. That is why milk itself is heated until all the little living things are killed. We say such milk has been *pasteurized*, because a Frenchman named Louis Pasteur taught us how germs cause disease. In many of our large cities only pasteurized milk can be sold. On the next page you see how milk bottles are steamed before they are filled.



Doctors and dentists boil their tools to kill the bacteria that cause sickness. Nurses boil or bake or steam their bandages. Why?

We go to a good deal of trouble to protect ourselves from bacteria. We use heat to fight bacteria. Most of the heat we use comes from *fire*.

Fire for Cleansing. I. Find pictures showing how fire helps to make things clean.

II. Ask your doctor, or your dentist, or your barber how he keeps his instruments clean and free from harmful bacteria.

III. Read in the encyclopedia about Louis Pasteur. Write a paragraph telling how he helped to put fire, the protector, to work.

How Fire Helps to Cleanse Milk. Visit a milk plant to see how milk is pasteurized. You will also enjoy seeing how the bottles are washed and how the milk is bottled.

THINKING BACK

Some boys and girls think that the story of fire is the most interesting story in this book. Do you? What parts of it do you remember best? What parts do you like best? Talk over the questions on this page. Perhaps they will help you to remember the most important parts of the whole story.

- I. What part of the whole story about fire did you most enjoy? Why did you like that part best?

- II. What were some of the things in the story about fire which surprised you?
- III. Make a list of the new words which you have learned in your study of fire. See who can make the longest list.
- IV. Who are some of the people who make their living because of fire? Would you like to earn your living in any of these ways? Give your reasons why.
- V. Which do you think men learned to do first — to farm or to make fire? Why do you think so?
- VI. If people had not learned to make fire, there are many things we now have which we could not have. What are some of these things?
- VII. Why did people first use fire for comfort only? Do you use fire to give you comfort or to help you work or to do both things? Prove your answers with examples.

UNIT III

THE STORY OF THE SEA

Section I.	Roads Over Land and Sea .	page 227
Section II.	The First Sailors . . .	page 253
Section III.	The Sailors and Traders of Ancient Egypt . . .	page 271
Section IV.	The Sailor Merchants of Crete	page 279
Section V.	The Great Phoenician Traders	page 287
Section VI.	The Sea Roads Grow Longer	page 305

I. ROADS OVER LAND AND SEA

Over most of the earth there are roads — roads across the land and roads across the sea. They lead east and west and north and south, to almost everywhere. Over these roads go the travelers. Over these roads go things to be sold. Why were these roads made? How do they help us?

ROADS OF THE WORLD

"What are you making, Uncle John?" asked Nancy. She and Pat looked over their uncle's shoulders at the map on his desk.

"A map," said Uncle John. "I was wishing for my ship and the sea. So I made this map."

Uncle John was a sea captain. He had been away from home for many months. Now he was back once more, resting before his next trip.

"Honest, Uncle John," said Pat, "don't you like living here with us in a comfortable house better than floating around in an old boat?"

"No," was his answer. "I can't say that I do. I love to visit you. But I like to travel around and see what is going on in the world."

Uncle John gazed proudly at his map. "Look at my map," he said. "It will show you some of the roads that people can use in traveling over the land and the sea."

Nancy and Pat bowed their heads over the map Uncle John had made.

"Do you see these green lines?" Uncle John asked. "They are the railroads. These red lines are the roads for automobiles and trucks. The blue lines are the rivers. All of them are roads over the land. See how many of them there are. They all lead to the great seaport cities, where the ships are waiting for the cargoes they are to carry to the countries beyond the seas."

"But, Uncle John," said Nancy, "all roads do not lead to the sea. Many people never go to the sea. So many roads do not lead there at all."

"That's true," said Uncle John. "People do travel from the farms to the towns. They travel from one town to another town. But all the small roads lead into the big roads. The big roads are the ones I have shown on my map, for they are the most important. They are the ones that lead to the seaports. Seaports are as important to a country as eyes and mouth are to us. They are the gateways to the outside world."

"But how did people ever learn where to place the roads?" Nancy asked.

"That was easy," said Uncle John. "All they had to do was to watch the travelers. Wherever men traveled over and over again, their feet or the feet of their animals left a trail. The road builders saw these trails. Then they knew where people wanted to travel.

"They saw farmers carrying food to market over the trails. The trails were rough, leading over the roots of trees, down into holes, through mud and sand. The road builders said, 'It is plain that farmers need roads. They must have them to get their food to market. We will build good smooth roads for them.' So they built good, smooth roads where the trails had been, leading from the farms to the towns.

"They saw merchants hurrying from one town to another with things to be sold. But the trails were not straight. They were not smooth. They were long and rough and uneven. Then the road builders said, 'Our merchants need good roads — roads that are smooth and level and straight — so that they can carry their goods from one town to another. They need railroad tracks, too. We will make roads for them.' So the road builders built more roads and railroads leading from town to town.

"They saw men laboring to get their goods from the cities to the seaports. Then the road builders said, 'Tradesmen need wider roads that are smooth and level, so that they can carry large loads of goods quickly to the seaports. They must take the things they have to sell to the great seaport cities. From there the goods will be sent to all parts of the world.' So the road builders made great roads to the seaport cities, too. They made them longer than all the others. They made them wider than all the others. They made them smooth and level. Then great loads of goods could be carried day and night to the ships waiting in the seaport cities."

"It must have been hard work to build all those roads, Uncle John," said Pat, looking at the lines on the map. "How did they ever get so many built?"

"It was a big job," his uncle said. "At first the work was all done by hand. The road builders used shovels and picks. How their backs ached in making the roads! Later they had teams of horses or mules, hitched to the large steel shovels that were used to help them in their work. But even then much of the work had to be done by hand."

"The road builders today have learned new ways of making roads. There is a steam shovel to hollow out the bed for the road. There is a concrete mixer

to mix the ground stone for the surface of the road. There is a steam roller to make the roads smooth. There are new kinds of materials to use, too — crushed stone and shells, asphalt, and concrete. The new machines help the men to work much faster.

“Many men, many horses and mules, and many tools and machines have been used to build the roads. Now the whole country is cut by beautiful, smooth, wide roads. These roads connect all parts of the country. They make it easy to travel from one part to another. We need still more good roads. They bind people more closely together.”

“I can see how important the land roads are in making us live better,” said Pat. “But your map shows roads over the water, too. Are the water roads as important as the land roads, Uncle John?”

“Oh, yes,” was Uncle John’s quick answer. “They are quite as important. Indeed if it were not for the water roads, we would not have the great civilization that we have today. I have another map here which will show you how important the water roads are and why they are important.”

Uncle John spread another map out on his desk. “You will see from this map that the world was very different before men learned how to make water roads,” he said.

Nancy and Pat looked at the map before them. At the bottom they saw a title, "Waterwalls," printed in large letters.

"What do you mean by 'waterwalls,' Uncle John?" asked Pat.

"What a queer-looking map! I don't understand it," said Nancy.

"This map," said Uncle John, "shows the way things were a long time ago before men had learned to sail the sea. It shows no roadways over the seas and oceans. Don't you see how people were shut up in their own land? Don't you see that the seas and oceans were like great walls that shut all the people of one country in, and shut everyone else out? There was no way for people to learn to know the people who lived in another country. There was no way for them to help one another. They could not cross the waters. There were no big, important roads such as we have today. There were no seaports."

"Oh, I see what you mean by this map," said Pat. "The sea itself made a wall that kept people shut up within their own land."

"Exactly," replied Uncle John. "People had to learn to use boats before they could travel very far from home. After that, they could get new

ideas from one another. They could learn new ways of living and working, of farming, of writing, of using metals, of building homes. So, you see, boats helped to make the world civilized."

"It's funny I never thought of that before," said Pat. "In fact, I never thought boats were very important until now. Why, Uncle John, you have one of the most important jobs in the whole world — sailing a ship! I almost wish I were a sea captain."

"Well," said Uncle John, "I like to see the world as it is here on my first map of today, the map showing how the land roads meet the sea roads. Now the people move freely from one part of the earth to another. There are no parts shut off from other parts. The roads — land roads and water roads — bind them all together. The world is like one big country."

Waterwalls. How can you show what you think Uncle John meant by "waterwalls"? How can you show best how water, in primitive days before men learned to sail the seas, made walls around the land? Perhaps you can make a map. Will you make it on the sand table or on the ground in the schoolyard? Or would you like to make it on a table and use paper pulp?

To make paper pulp, tear newspapers into small bits. Soak the paper in water for two or three days. Then squeeze out the water and add some fresh water and a

small amount of mucilage or paste. Beat this pulp until it is fairly smooth. You can do this with a stick. The pulp will be like clay while it is wet. When it dries, it will be stiff and will hold its shape.

As you try to make your map, imagine how Uncle John's map must have looked. To show you where to place the land and the seas, find a map of the world in your geographies or in some other books. Perhaps you have a world map hanging on the wall of your schoolroom. Perhaps you can get some ideas from the maps inside the front and back covers of this book.

Roads over the Land. I. The road builders learned where to build their roads by watching the travelers. What kinds of travelers did they see? Between what kinds of places did they find people traveling and carrying their goods? Between what kinds of places did they have to build the greatest number of roads and the largest?

II. Can you find a road map of a section of the United States showing some important land roads? What important cities or towns does each road connect?

III. Make a map of our country. Draw land roads — the three kinds of roads which Uncle John described. Where will you draw the roads? Maps in your geography will help you to find out. Make your map beautiful with color and with good printing. Make your map interesting with pictures of the different kinds of vehicles which use the roads. Can you make it tell the story of roads and seaports and travel?

IV. Explain why all the roads we have are very important to us. In your answer talk about roads over the land, roads over the water, and roads through the air.

ROADS OVER THE WATER

It took many thousands of years for men to learn to sail the seas. At first they stayed close to the land, for they were afraid of the unknown waters. But as years went by, boats grew larger and stronger and swifter. Sailors grew more venturesome as they learned better ways of sailing their boats. Then they left the friendly shores and sailed out among rougher waves.

At first, of course, they sailed just anywhere. They had no way of telling the direction in which they were going except by watching the sun. There were no maps to guide them.

Ships lost time going from one seaport to another. Sometimes they did not sail the shortest way. Sometimes they ran too close to rocky shores and were wrecked. Sometimes they went too close to the icebergs — the mountains of ice which float partly hidden under the water — and were lost. Sometimes they ran into parts of the ocean where it is often stormy. Sometimes they sailed into parts of the ocean where there was no wind to fill their sails. Sometimes they went where tangled seaweed caught their ships and wrecked them.

"The sailors need roads, too," said the road builders. "They must know the shortest and safest

paths across the ocean. We must make roads through the seas for the sailors."

So other road builders made roads over the seas. They did not use picks and shovels in building their roads. They did not use concrete mixers and steam shovels. You will never guess what they used. They used pencils! Sea roads are paper roads, you see. They are really nothing but charts, or maps, made on paper. There are no real roads on the sea at all. There cannot be. The roads are carried inside the ships, in the chartrooms, where the officers work. These charts mark the parts of the sea which are best for the big ships to travel.

As the sailors sailed the seas year after year, they learned many things. They learned which way to go to keep out of the worst storms. They learned which way to go to keep away from the great icebergs. They learned which way to go to save time. As they learned about all these things, they made maps and charts for other sailors to use. They showed on the maps where the dangerous places were. They showed the shortest and safest paths for the ships to follow. They made sea roads.

You ride over one of these sea roads all the way if you cross the ocean. Would you be able to see the road? Would you know where you were at any

time while you were crossing? No, there is no path in the water. There are no signs, such as we have on land, to tell you where to go. There are no places marked with posts which read: "10,000 miles to Calcutta. Turn left at the next corner," or "Route 69 — 3200 miles to New York."

Even the captain cannot tell exactly where the ship is. But he has ways of finding out. In his chartroom he has charts and maps with the sea roads marked upon them. On the bridge, where he stands to direct the ship, are instruments which he uses to find out the exact spot where the ship is. Every few hours, day and night, the captain and his officers use these instruments to find where the ship is. Then they make a cross on the map and mark the time. Afterwards the chart tells just where the ship was at each hour of the trip. It tells how fast the ship traveled, too.

Officers on ships of today often use radio to help them in keeping their ships on the right sea road. A radio direction finder helps them to do this.

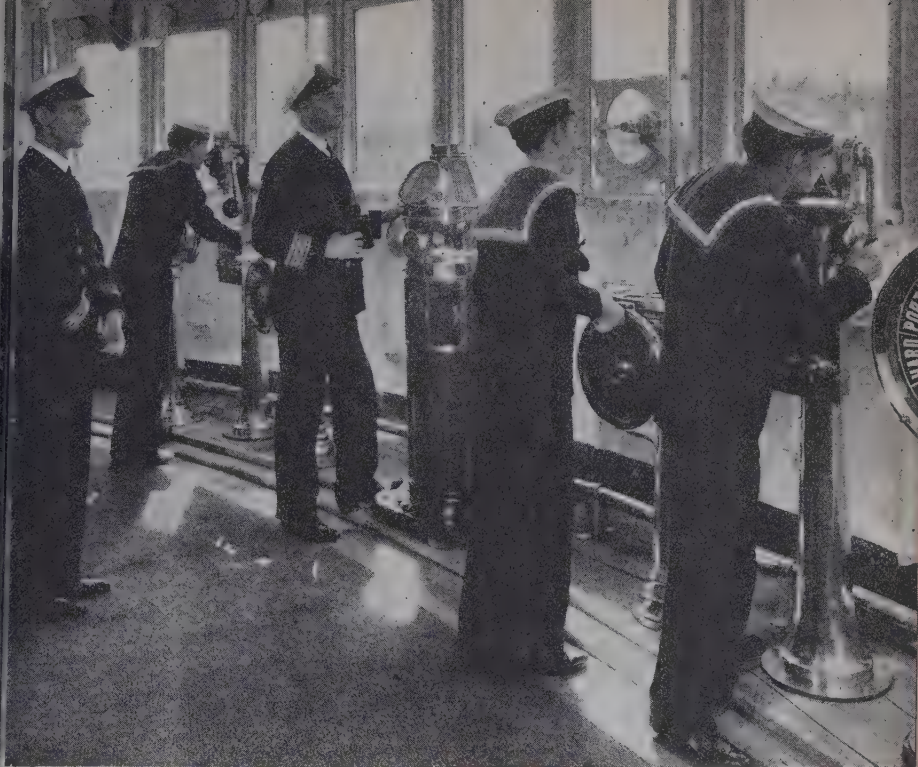
On the next four pages are pictures showing just how a ship's officers keep that ship on her right sea road. You can see the chartroom, the bridge, and the engine room. You can see the officers using instruments to find out the position of their ship.



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THE CHARTROOM OF A GREAT SHIP

These officers are charting the ship's position. They have many maps, charts, and instruments to help them in this work. They can find out the direction in which they are sailing and can tell exactly the spot in the ocean at which the ship is located at any time. When they find where they are, the captain will mark the position on the chart with a dot.



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THE BRIDGE OF AN OCEAN LINER

The bridge of a ship is the place from which the ship is controlled. Notice the number of men on watch on the bridge of this ship. These men keep their eyes on the sea road. They use various instruments to help them. They report to the officer in charge. Commands are sent from the bridge by the first officer, who is third from the right in the picture, to the engine room. In the engine room are the officers who carry out the orders from the bridge.



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THE ENGINE ROOM

This picture shows the control platform of the engine room. Some of the dials tell the engineers how fast the ship is going and in what direction it is going. The larger dials carry the messages from the bridge, telling the engineers whether to go faster or slower or to reverse the engines.



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USING THE SEXTANT

This officer is using a sextant. He is finding the position of the ship by looking at the sun. He calls this way of finding the ship's position "shooting the sun." The sextant is used several times a day, and the record of the ship's position is placed on the chart.



Copyright by Cunard White Star Limited

A DIRECTION FINDER

The officer in this picture is using a direction finder. He is finding out, by radio, whether the ship is on the right sea road.

And so you can see how men have made their land roads and their water roads and how these roads have helped men to build up a great civilization.

Building Sea Roads. Find in your book a picture that shows sailors using the waterways. Explain why we say that the sea roads were made with a pencil. Explain how a captain keeps his ship on the right road.

THE GREAT SEA ROADS

There are many sea roads. Some of them are very long. Some are short. Some run east and west. Some run north and south. Some run first in one direction and then in another. Each of these sea roads begins and ends at a seaport.

Some of the sea roads are very busy roads. Ships come and go on them all the time. On others there may be scarcely a dozen ships a year.

There are two sea roads that are more important than all the others. You can find them in the map on pages 244-245. One of these great sea roads leads from North America to Europe. That one is called The North Atlantic Sea Road. The other one leads from Asia to Europe. It is called The Mediterranean Sea Road, because it passes through the Mediterranean Sea.

The North Atlantic Sea Road is the busiest sea road in the world. Every hour of the day and night, ships are leaving the great seaport cities of Europe and America. Every hour of the day and night, ships are landing in the port cities. Great steel ships loaded with thousands of tons of grain from Canada or the United States! Huge ships loaded with machinery for the factories of Europe! Ships

ARCTIC OCEAN

GREENLAND

NORTH
AMERICA

UNITED STATES

HAWAII

PACIFIC
OCEAN

PANAMA
CANAL

ATLANTIC

SOUTH
AMERICA

OCEAN

ANTARCTIC OCEAN

SEA ROAD





loaded with automobiles! Ships loaded with airplanes! Ships loaded with cotton! Great floating palaces filled with people! Ships from the United States of America loaded with toys for the children of Europe! Ships from Europe loaded with toys for the children of America!

The Mediterranean Sea Road is almost as busy. Great steamships hurry along toward Europe. They are carrying from Asia and Africa things that the people of Europe need for food, for clothing, and for their homes. Shiploads of silk for the factories of Europe to make into dresses or silk stockings or curtains! Thousands of sacks of rice! Cargoes of tea and spices! Grain and meat and rubber! Beautiful Persian rugs! The ships are coming from the faraway ports of India, Persia, Japan, China, and Australia and from the nearer ports of Egypt. Without these ships, how could the millions of people in these faraway lands ever earn a living for themselves?

Not all the ships are headed toward Europe. Half of them are steaming away from Europe toward the ports of Asia and Africa. They are carrying things which the workers of Europe have made in their factories. Tin pans and cotton cloth and chocolate bars! Silk cloth made into clothing, dyed, and ready for use! Many other kinds of cargoes are carried.



Philip D. Gendreau

CARGOES

Loading cattle at an American port and coal at a foreign port.

How could millions of workers in Europe earn a living without the ships that carry the goods they make to be sold in far countries?

It takes many thousands of big ships to carry all the goods and people from one place to another. These ships are scattered all over the miles and miles of sea roads. Sometimes a ship travels for weeks without meeting another vessel. In the harbors you see only a few of the ships at one time.

There is one place where it is possible to see more ships than at any other place in the world. This is a place just south of Ireland. Can you find this place on the map on pages 244-245? Most of the ships that carry cargoes, or loads, to Europe pass through this narrow strip of water. Most of the ships that carry cargoes from Europe to America or Asia go through this same strip. Day and night the ships of the whole world come and go over this part of The North Atlantic Sea Road. It is the meeting place of ships.

Men have made the sea roads of the world as safe as they know how. But there are still danger parts that sailors dread. The North Atlantic Sea Road has some parts that are the most dangerous of all.

There are many storms on the Atlantic Ocean and in the North Sea. Sometimes the wind blows so

hard that the waves rise higher than a two-storied house. A ship caught in such a storm has a hard time. Tons of water dash over it. Sometimes the small boats carried by the ship are torn loose. Masts are snapped off and windows broken.

But storms are not the only danger on this sea road. Often great icebergs float down from the Arctic Ocean. Most of an iceberg is under water and cannot be seen. Only the very top sticks out above the water. For that reason a ship might run into an iceberg long before the part above the water seemed close.

Some years ago a ship named the *Titanic* ran into an iceberg and was sunk. The *Titanic* was the largest steamship that had been built up to that time. Hundreds of people lost their lives. Since then, two changes have been made to help make this road safer. A new road was made to be used in the winter and spring when the icebergs are most dangerous. Besides this, an ice patrol has been placed in the iceberg region. This ice patrol is a group of ships that go back and forth watching for icebergs. The boats on the ice patrol report by radio all the icebergs they find. They tell exactly where each iceberg is and how big it is. The radio operators on the ships hear about the icebergs. They report to the captains.

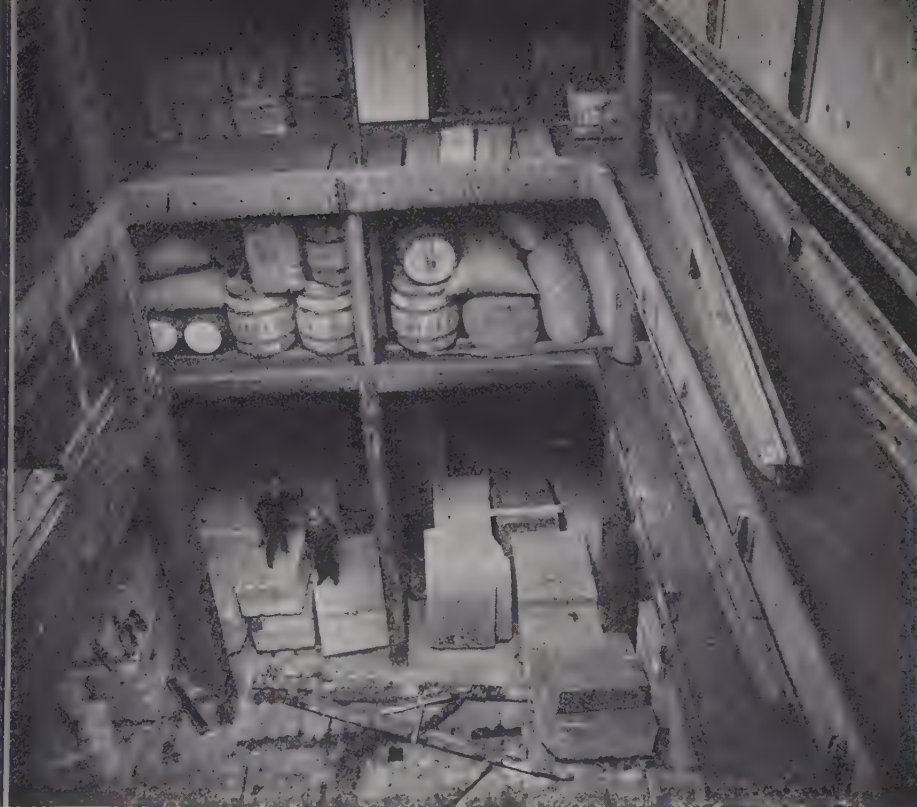
Then the ship captains know where the danger is and can keep out of harm. Men are doing all they can to make the great sea roads safer.

THE GREAT SHIPS

If you were to take a trip to Europe, you probably would travel on The North Atlantic Sea Road. You might go on a steamer so large that it would seem like a huge hotel. Your bedroom might be called a stateroom. There would be several dining rooms. There would be a library, a music room, a playroom with many toys, a gymnasium, and a swimming pool. There would be rooms where you could rest and talk. There might even be shops and a theatre on your ship.

You probably would be surprised at the size of the ship. Big decks and cabins which can be used by all the passengers take up a great deal of room. There are many staterooms. The huge engines and the other machinery in a large ship take up a lot of space. Much space would be needed, too, for the hold, the place where freight is kept. A picture of the hold of a liner is given on the opposite page.

This hold, where cargo is being stored on this ship, is far down under the water. How huge it is! How small the men look!



THE CARGO HOLD OF A LINER

Courtesy French Line

Perhaps the pictures you have seen in steamship folders will help you to understand how large these great ships really are.

Roads over the Seas. Make a map showing the two most important sea roads. Show ships passing to and from the seaports. Mark each ship in such a way as to show the kinds of cargoes the ship is carrying. Where would you place the greatest number of ships? Where would you place the ice patrol?

Stories about the Seas and Ships. Find the book, *Liners and Freighters*, by Wilson Starbuck. It has two especially interesting stories about the sea. They are "Donald Learns about a Ship" and "Donald Explores a Modern Steamship."

The book *How the World Grows Smaller*, by Daniel J. and Dorothea Beeby, also has some interesting stories about ships and the sea.

Pictures of Ships. Find good pictures of ships and study them, for they will tell you many things about ships. The book called *The Picture Book of Ships*, by Peter Gimmage and Helen Craig, will help you in your search. It has pictures of all kinds of ships and a good description of each.

Telling about Ships. Choose one of the topics below, and find out some interesting facts about the topic to tell the class. You might look in your geography, in the encyclopedia, or in other books. Look under such topics as *Ships*, *Lighthouses*, and *Canals*.

Here are several topics. Choose one of them for your study.

1. How a big ship is steered.
2. How a ship finds her way at night or in a fog.
3. How lighthouses and lightships help the sailors.
4. What ship canals are used for.
5. How locks in canals are used.
6. How a large ocean liner is like a huge hotel.

II. THE FIRST SAILORS

It took people a long time to find out how large the world really is. They did not learn this until after they had learned how to make ships. How did men find a way to ride on the water? What kinds of boats did the early people make?

THE FIRST BOAT

Primitive people did not travel much. They could go only as far as their own legs could carry them. Often they were shut up in their own small places of living by walls of different kinds. Sometimes the walls were high cliffs that were hard to climb. But more often the walls were the seas or the rivers that were too deep to wade across. Of course, just as the walls shut one group of people in, so they also shut other people out.

People who were born on islands were also shut in. They could go only to the edge of the water. They had to live on their little islands all their lives. Their children kept on living there; and so did their grandchildren and great-grandchildren. None of them could travel beyond the waterwalls. These

people probably believed that their island was the whole world.

People living along the seacoasts were shut in. They could travel inland, away from the sea, unless there was another wall of mountain or water behind them. But they never could cross the water. The great wall of water stopped them. The seacoast people probably believed the earth only as large as their strip of seacoast.

People living between two rivers were shut in, too. They probably thought that the earth went only a little way beyond the rivers, as far as they could see.

As time went on, people began to find ways of getting outside these walls of water. Imagine their surprise when they began to find out how big the earth really is!

Nobody knows exactly how people first learned to travel on the water. The first sailors lived so long ago that there is no record of them. We do not know who they were or where they lived. We do not know how they happened to discover ways of using the water for travel.

Probably people first learned to get across water by swimming. Perhaps they learned to swim by watching the animals paddle with their legs. Perhaps they learned by falling into the water, and then

kicking and throwing their arms about until they reached land again.

The early people did not always have to cross rivers by swimming. Sometimes they found bridges they could use. Of course these were not like the bridges we have today. The first bridges were probably trees that had blown down and fallen across the rivers. Later the early people may have made bridges themselves by throwing a great tree trunk across a stream.

Perhaps it was when they tried to use fallen trees for bridges that men first learned that logs will float. Or, perhaps some traveler stepped on a log that lay loose near the bank of a river. The log swung out into the middle of the river. The surprised traveler found himself floating down the river on a tree trunk. He rode on the log until it ran up on the shore farther down the river.

There are other ways in which men may have learned that a log will float. Perhaps someone fell into a river. He may have seized a log lying at the edge of the water. It may have rolled away from the shore as he tried to climb upon it, and carried him down the river. Perhaps someone noticed animals riding on floating logs. Perhaps someone watched children floating bits of bark on the water.

In some way, then, men learned that a log will float. Very soon, too, they learned to make the log go in the direction they wished by paddling with their hands or with a branch from a tree. For the first time, then, people really had boats. For the first time, a stream of water became a roadway to take people where they wanted to go.

The Discovery of Boats. Perhaps your class would enjoy working together on a class story. This story might show what a narrow life people lived before the time of boats. It might tell of some group of people who had never left the island where they and their people had lived for centuries. Then it might tell about their discovery of the use of boats and their trips to other lands. Finally it might tell of the changed life that came after they had a chance to see how other people lived and to learn from them. Plan what chapters you will have in your story. Perhaps you would like to make your story into a booklet.

Your story should be carefully planned. Talk the matter over together and decide just what characters you will have, what you will have each one do and say, and what the island will be like. Then you might divide the class into committees and let each committee prepare one chapter of the booklet.

Traveling by Water. Make some pictures which will show ways in which you think men may have first traveled by water. Let the pictures tell a good story. Take time to make your pictures interesting.

MAKING RAFTS AND DUGOUTS

Traveling downstream on a floating log was a good idea. It started many other good ideas, too. The floating log taught men to build real boats.

"Why not tie some logs together?" someone asked. "Then we can have more room." They did this and found they could travel much better. They had made what we call a *raft*. This raft did not roll in the water. It did not tip over. It would hold more than one person at a time. It was much better than a single log.

This log raft was perhaps the first kind of boat to be made. Sometimes the rafts were very wide, with eight or ten logs tied together with vines or strips cut from animal skins. These rafts could carry quite a cargo, or load. You can see a raft in the picture opposite page 258.

Later, people began to put a floor or platform above the logs. This made a dry place for the cargo. Still later, men built up the sides of the raft to keep the water out. As the sides became higher, the raft began to look more like a boat.

The rafts were not always made of logs. In some countries there were no forests. Egypt had no forests. Yet the Egyptians were among the first people to travel on the water.

The Egyptians made rafts of reeds. The stems of the reeds were tall and thick. They made good rafts. These rafts were light and easily managed. They floated as well as log rafts.

Sometimes skins of animals were filled with air, like a balloon, and tied under the rafts. They helped to hold up the rafts and make them float better. Then the rafts could be piled high with a heavy cargo. They would not sink. Such a bag of air is called a *skin float*. In some countries of Asia the skin float is still used for heavy loads. The middle picture opposite shows a skin float.

Another kind of boat that the primitive people had was the *dugout*. You can see one on the opposite page. It was a log with the center dug out. At first, people may have had dugouts only when they happened to find hollow logs. But later they learned to hollow out a log themselves.

Probably they made their dugouts in some such way as this. First, they cut down a straight tree with their crude stone axes. They cut off the branches and made the log the length they wanted. Then they built a small fire at one side of the log, at about the middle. They let this fire burn slowly for a while. Then they pulled the log away from the fire and dug out the burned parts of the wood



THE FIRST BOATS

Rafts were probably the first boats that men made themselves. The upper picture shows a log raft. The middle picture gives you an idea of how a skin float looked. The lower picture shows primitive dugouts.

with sharp stones or shells. Then perhaps a small fire was lighted in the burned-out hole. In a little while, the fire was put out again, and the burned part was again dug out. The boatbuilders kept this up until the hole in the log was the size they wanted. It was big enough to hold a man or a cargo.

As the years went by, men learned to make better dugouts. They learned to make the ends of the log pointed. They learned to build up the sides of the log with planks. That made the dugout deeper, so that it would hold more cargo. They added seats. They made poles for pushing the boat through the water. By the time they had done all of these things, the dugout was quite a good boat.

The floating log, the raft, and the dugout were the only boats for thousands of years. Probably during those years people did not travel much on the water except on the smaller rivers.

LARGER BOATS FOR THE TRADERS

You remember that people began to live and work in new ways after the farmers had learned to raise enough food for everyone. They began to make things to sell. At first, they sold these things to the people of their own villages and cities. Later, they began to sell the things they made to traders.

The traders were people who made their living by buying and selling. They bought things from the farmers and from the craftsmen and sold them to other people. They bought things for as low a price as they could. They sold them for as high a price as they could. The difference between the cost price and the selling price was their gain, or profit. It was their pay for their work in trading.

For a time, the traders went up and down the rivers, selling things to the people who lived along the banks. They carried the goods in their boats or rafts. They did not go far from home on these trips because they were afraid of meeting enemy tribes. Later, the traders became braver. They went out into the open sea.

The traders soon found that they needed larger boats. The dugouts were too small to be safe on the sea. They were too small to carry a large cargo of food or other goods. It did not pay to take long trips in such small boats. There was not enough profit on the small cargoes to pay the traders for the time. How could they carry a larger cargo?

The traders began building larger and larger dugouts. Some dugouts have been found that were fifty or sixty feet long. But such boats were not safe. They were hard to manage because they were

too narrow for their length. A dugout could not be made wider than the largest tree the builders could find.

In time, people learned to build boats of the size and shape they wanted. To make these boats, the builders first built a frame. They took a straight piece of wood that was as long as they wanted the boat to be. That was the main beam of the frame. It was called the *keel* of the boat. Smaller pieces of wood, called *ribs*, were fastened to the keel. The ribs stuck out from the keel on both sides. The builders were careful to make the ribs exactly alike on both sides of the keel.

When the frame was finished, the builders covered it with boards or skin or bark. Perhaps at first they fastened the cover to the frame with strips of leather. Later, they learned to use wooden pins, called *treenails*, to fasten on the boards. The boats made in this way were wider. They were deeper. They were safer. They held more goods. The traders could carry bigger cargoes in them. That meant that they could make more profit.

Ships are built in much the same way today as they were when men first built boats. Now the keel and the ribs and even the outside covering are often made of steel. Boats today are much larger

than they used to be. They are a different shape, too. But they are still put together in much the same way as those early boats were.

Early Boat Building. I. In what ways may the early people have learned how to build boats? The book called *The First Days of Man*, by Frederick A. Kummer, will help you to answer that question. Look in the Table of Contents and see on what pages you will find the stories "Ma-Ya Builds a Canoe" and "The First Boat."

II. Make pictures to show how a dugout was made.

III. Explain to the class how skin floats were made. How did they help people to have better rafts?

IV. How did people learn to improve their boats? Do you think they copied other boats? Did someone teach them boat making? Decide how you would answer these questions. Then write your answers.

V. Shipbuilders have had different ways of building their boats. Explain the difference between these methods. Make a model showing a partly finished boat of each kind.

MAKING BOATS MOVE

You remember that when men first began to ride on logs, they let the logs float with the current. They could only guide them a little with their hands. Of course, they always had to ride down the river. They could not make the logs go back up the river against the current.

After a while, men learned to guide their rafts and dugouts with long poles. They learned to make them move in any direction. As they stood on the raft or boat, they pushed with poles against the bottom of the river, against a rock, or against the bank. This moved the boat forward. It is called *poling a boat*.

Then someone found that he did not need land or rock to push against. He discovered that he could push against the water itself and move the boat forward. Of course, he could not use a thin pole to do this. A thin pole cut through the water too easily. He needed something that was wide at one end, so that it would push against more water. He made a *paddle*. The paddle was wide at one end. Pushing against the water with the wide end made the boat move forward. The man found that if he paddled first on one side and then on the other, the boat would go straight. An early boat with a paddle is shown opposite.

Later, someone thought of another way to use the paddle.

"What I need," he thought, "is something to help hold the paddle, so that I can use both hands."

He cut a narrow slit on each side of the boat, along the edge. Then he rested the handles of the two



Courtesy of the National Museum of Natural History

A SKIN BOAT

How would the paddle help this woman to move her boat?

paddles in the slits. The slits were large enough for the paddles to turn in all directions. They were too small for the paddles to slip out of the top easily.

The man seated himself between the two paddles. He took one in each hand. Now he could push against the water on both sides of the boat at one time. He could go much faster. He could make the boat go straight. His paddles had become *oars*. He had learned to row a boat. He had made what we call a *rowboat*.

As the boats became large enough to be called ships, many oars were used to move them. The oars were placed in rows along the sides. Ships with one row of oars on each side were called *galleys*. The galleys often had fifty oars, twenty-five on each side. Galleys were used by the Egyptians, by the Phoenicians, and by many other early people. The men who did the rowing were called *oarsmen*. Each oarsman managed only one oar. The one oar was so large that it took a man's two hands to row with it. Therefore, a galley with fifty oars needed fifty oarsmen.

Later, the people wanted swifter ships. One row of oarsmen could not move them fast enough. So the shipbuilders put a second deck on the ships. They put another row of oarsmen on each side of

this deck. Ships with two rows of oars were called *biremes*. The picture on the next page shows you some of these biremes. Sometimes it took more than one hundred men to row a bireme.

Then the people wanted still swifter ships. So three rows of oars were put on each side of the deck. Ships with three rows of oars were called *triremes*.

Most of the oarsmen in ancient times were slaves. Some of these slaves were prisoners taken in war. Others were men who had been stolen from their homes. Slaves were cheap in those days. For that reason the owners did not take good care of them. They made them work too hard. They were cruel to them, too. Sometimes they did not give them enough food. Often the galley slaves were chained to their seats. The owners did this to keep them from running away. In case of a shipwreck the poor slaves were often drowned because they could not get free.

Galleys were used in many ways in the early days. Some of them were trading ships, carrying cargoes to every part of the world that was known then. Some of them carried soldiers out to battle. Some of them were the ships of kings and princes who wanted to go about on the seas. Some of them



Courtesy First National Bank of Boston

BIREMES OF PHOENICIA

Notice the way the oars were placed in biremes. These biremes were built in the shipyards of Phoenicia.

helped men to find new parts of the world. These galleys were the greatest ships up to their time. They helped the different people of the world to know more about one another.

The ancient people did not always use oars to move their boats. They learned that the wind could push a boat over the water. So they came to use *sails*. The sails were fastened to tall poles, called masts. The wind blew against the sails and pushed the boat along. At first, people used sails only when the wind was blowing in the direction they wished to go. Later, they found out how to use sails to make the boat go where they wished.

For many centuries most ships had both sails and oars. But the oarsmen took up a great deal of room in the ship. They took up space that the traders wanted for more cargo. Then the traders began to use sails alone. It was lucky that they had learned how to make good sails and how to use them well.

A little more than a century ago, men found a better way to move ships. That better way was to use *steam engines*. Now there are a great many more steamships in use than sailing ships.

Within the last few years men have found that *electric motors* can be used to move ships. Ship

motors are somewhat like automobile motors but much larger.

Ships today use many machines. Besides those used for moving the ship, there are machines for guiding it, machines for sending messages, machines for heating and lighting the ship, and machines for loading and unloading the cargo. Can you find out about other kinds of machines that are used on ships?

Making Boats Move. 1. Find pictures that show the different ways which are used to make a boat move. Can you get good pictures of paddles and oars and sails? What other ways are there of making a boat move?

II. Explain to the class why rowing makes a boat move through the water. What is meant by paddling a boat? What is meant by poling a boat?

III. How are sailboats made to move forward when they are headed against the wind? If you do not know, find out. Look up the word *tack* in the dictionary. What the dictionary tells should help to answer the question.

IV. How are steamships made to move through the water? What do they have that take the place of oars or sails?

Different Kinds of Boats. Study the pictures in your book to see the different kinds of boats that have been used and that are being used today. Can you find other pictures? Perhaps you would enjoy making a picture collection of boats and ships.

III. THE SAILORS AND TRADERS OF ANCIENT EGYPT

The people who lived on the banks of the Nile River learned to be good sailors and traders. After they had learned to use boats on the river, they went out on the open sea, too. What were the Egyptian boats like? What cargoes did they carry?

EGYPTIAN BOATS AND CARGOES

Probably the Egyptians were among the first boatbuilders of the world. That was because they lived along the friendly, gentle Nile River. The Nile was their teacher. It taught them how to make the water work for them. It was a great water road, too, through the middle of their narrow country.

For many years the Egyptians did not go out on the Mediterranean Sea. But they gradually became braver and, at last, sent their boats out to the sea. As time went on, they went farther and farther from home. They found new lands. They learned to know other people. They found where they could buy things they needed, and where they could sell things they did not need for themselves.

To do this, the Egyptians needed good ships. The Egyptian shipbuilders were among the best in the world at that time. They knew how to build small wooden boats that were light and easily managed. They knew how to build large ships for the traders. These traders' boats had to be large enough to give plenty of room for the cargo. They had to be strong enough to carry heavy loads of grain or stone or lumber. You can see Egyptian shipbuilders working on a small boat in the picture on the opposite page.

Most of the Egyptian ships were made with frames of light wood. The frames were covered with heavy boards. They had straight, low sides and high ends. Often great flowers or heads of animals or birds were carved or painted on the high ends of the boats.

Inside the larger ships, at each end, was a platform. On the platform at the front, or *pro*w, of the ship stood the lookout. The lookout was a man who kept watch for danger — sharp rocks or enemy ships. On the platform at the back, or *stern*, of the ship stood the master of the oarsmen. He steered the boat, too.

The seats for the oarsmen were placed along the sides of the ship. The oarsmen sat or knelt or even



EGYPTIAN SHIPBUILDERS AND THEIR TOOLS

In the upper picture Egyptian workmen are building a small wooden boat. This was one type of boat used on the Nile. Other boats used by Egyptians are shown opposite page 274 and on page 276.

The lower picture shows the tools used by these Egyptian shipbuilders. Can you tell what each tool was used for?

stood on these seats. It was hard work to row the heavy loads and to fight the fierce waves.

Toward the middle of the ship was a large mast. Often the mast was put up in such a way that it could be taken down if the sailors wished to do so. The sails were fastened to the mast. Usually they were large and square. They were made of linen. There was beautiful needlework on some of them.

Often a boat had one or two rooms, or cabins, in the center like the one shown in the lower picture opposite. You will notice that there were no oarsmen on this boat. Often the Egyptians used the sail alone.

If you had looked out on the Nile at any time in those days of long ago, you would have seen all kinds of boats. Gay pleasure boats carrying parties of nobles and their friends! Large grain ships belonging to the Pharaoh! Little reed fishing boats! Slow-moving rafts piled high with vegetables! The river was full of boats from one day's end to the next.

Most of the ships never left the Nile River. They carried things from one village to another. They carried things from the villages to the cities along the Nile. Almost everything that was moved in Egypt was carried in boats on the river. There were few land roads.



BOATS ON THE NILE

If you had been in a boat on the Nile long ago you might have passed the little reed fishing boats shown above. You might have seen the wealthy noble's boat with its sail and cabins shown below.



AN EGYPTIAN CARGO BOAT

In the picture above oarsmen are rowing an Egyptian cargo boat up the Nile. The master of the oarsmen is in the stern of the boat. He sees that the oarsmen keep rowing. He steers the boat, too. Do you see how he steers by means of paddles fastened on either side of the boat?

Other ships went back and forth across the Mediterranean Sea. They carried grain and wine and dates to trade for the things they wanted.

Imagine you are standing on a stone wharf in the city of Thebes, looking out over the river Nile.

“What are those ships carrying?” you might ask.

“Those are the boats carrying stone for the Pharaoh’s pyramid,” someone would explain. “Great

pieces of stone are on those ships. They weigh fifty or sixty tons each. They have come five hundred miles down the river. The places where the stone is dug out are called quarries. Slaves work day and night in the quarries getting stones for the builders. In each of those boats there are from thirty to fifty slaves pulling at the oars. Most of the slaves were captured in the last war."

"And those other ships?" you might ask. "What are they used for?"

"Those are the lumber ships from across the sea," would be the reply. "They have visited the harbor of Sidon in Phoenicia. Egypt has no forests of her own. All the wood which her shipbuilders use must be brought in from some other country. All the wood that her craftsmen need for furniture, for tools, and for buildings has to be brought hundreds of miles. It comes over the waters of the Mediterranean Sea."

As you watch the river from the wharf, you would see ships with gay linen sails belonging to officers of the Pharaoh. You would see rafts piled high with jars of honey or with bottles of wine. You would see ships loaded with slaves coming from Ethiopia, and ships loaded with olive oil going to the market in Thebes or Memphis. You would see

boats filled with flax, with fish, with hides, or with vegetables. There would be many ships from other countries, too — from Crete, from Cyprus, or from Phoenicia. As you watch, you would see hundreds of boats passing. The Nile River is a busy place.

An Egyptian Boat. Make a drawing of an Egyptian boat. Write a legend describing the boat.

The Oarsmen. The Egyptians used slaves as oarsmen. How do you suppose they got the slaves?

The Busy Nile. I. Make a set of pictures which will show how you think the Nile River looked. What kinds of ships will you put on the river? How many? Can you make the Nile look like the busy place it was?

II. Write a statement telling why the Nile was such a busy river. In the book *Egyptians of Long Ago*, by Louise Mohr, Carleton Washburne, and Willard W. Beatty, there is a story that gives a good picture of the busy Nile. Look in the Table of Contents for the story "With the Boatmen on the Nile."

On the Great Sea. I. Make a map showing the places which Egyptian traders most often visited. Paint ships upon the sea and show what cargoes they carried.

II. There is an interesting story about sailing the seas in the days long ago in the book *Inventions and Discoveries of Ancient Times*, by William L. Nida. Look in the Table of Contents to find the story "King Khafre and the Sea Pirates."

IV. THE SAILOR MERCHANTS OF CRETE

This is the story of some other sailors and traders who lived on an island called Crete, right in the middle of the Mediterranean Sea. How did ships change the lives of these people?

HOW THE CRETANS BECAME SAILORS

In the Mediterranean Sea, northwest of the Nile Valley, is the island of Crete. The Cretans learned to sail the seas in very early times. Perhaps they learned as early as the Egyptians did.

After the Cretans had learned to make boats, they found that they could visit other islands near by. They could visit lands far to the north and south and east. They could travel west as far as they dared. What a surprise it must have been to the Cretans to find that the world was larger than just their island! Soon they knew all the people living on the shores and islands of the eastern part of the Mediterranean Sea.

The Cretans became great sailors and boatbuilders. They did not have a gentle river, like the Nile, to

teach them how to sail. They learned from the great, rough, stormy sea. Unless they had good ships, and unless they knew how to sail them well, they could not travel on the sea. So they became good sailors and shipbuilders because they had to.

The Cretans learned to make strong boats because light ones were crushed by the heavy waves. They learned to make swift boats because they had to go a long distance to visit even the nearest island. They learned to guide their boats carefully so as to keep them from being lost at sea. They became so used to the sea that they had no fear of winds and storms and waves.

Before the Cretans learned to sail the seas, they had spent most of their time getting enough food to eat. They fished and hunted for part of their food. Some of them raised sheep and goats, and some farmed. But the soil of the island was thin and stony and hard to farm. It is not strange that many of the Cretans were glad to become sailors.

The sailors visited other lands and found out how other people were living. They were surprised to see the many kinds of work being done. They watched potters at work. They saw men coloring cloth by dyeing it. They saw craftsmen making furniture and tools and weapons. Each time the

sailors returned to their homes, they had wonderful stories to tell of what they had seen.

Many of the people of Crete stopped farming then and became craftsmen. At first the craftsmen did not know how to make good, sharp knives and well-baked bowls. They did not know how to weave fine cloth or make beautiful colors for their dyes. They had lived so long by themselves on their little island that they had not had a chance to learn from people in other lands.

But the sailors could see how others were working. They learned everything they could. They asked questions. They watched workers. They even tried their hand at doing work they saw others do. They knew that if the Cretans were to become good craftsmen; they would have to learn from other people.

So the sailors became the teachers of the other Cretans. They were willing to do this because they wanted things to sell to other countries. They wanted the things they sold to be well made.

The sailors visited Egypt. There they saw the Egyptian potters making bowls and vases. They watched to see how the work was done. They found out what material was used. Then they bought some of the vases and took them home for the Cretan potters to copy.

They saw Egyptian linen so fine that it looked like silk. So they seized an Egyptian weaver. They carried him to Crete in their fast ships. They made him a slave and made him teach their weavers how to make fine linen.

They saw Egyptian oarsmen rowing their boats with their backs toward the prow. They could make the boats move faster that way. So the Cretans, too, began to row backwards.

They saw the men of Egypt putting black, sticky gum over the cracks in their boats to keep out the water. The sailors watched the workmen heat the gum. They watched them put it on the ships. They asked many questions. The wise Egyptians would not answer their questions. They did not want the Cretans to learn their secrets. The Cretans sailed away. But they returned after dark and stole a cargo of the gum. When they sailed into the harbor at Knossos, their seaport, they had gum enough to keep the water out of many Cretan boats.

The Cretan traders bought cargoes of grain from Egypt, too. Then the farmers of Crete did not have to raise so much food. More and more of her farmers could become craftsmen and sailors.

As time went on, the Cretans learned to make many beautiful things. They became such skilled

workmen that everyone wanted to buy their goods. The people of other nations used to boast that the things they owned had come from Crete.

"My furniture came from Knossos," an Egyptian lady would tell her neighbor proudly.

"My father brought me this bowl from Crete," a little girl in Babylonia would tell her playmate.

THE MERCHANT FLEETS

As time went on, the Cretan merchants became very rich. Their fast ships carried many cargoes. Each cargo brought them profit. They learned to buy things carefully from the craftsmen. They learned what things could be sold in other countries. They were good salesmen, too.

Many of the rich merchants had fleets of ships of many sizes and kinds. Some traders had only one ship apiece. Each ship had its captain, its sailors, its officers, and its slave oarsmen. Sometimes the trader himself was the captain. Often he remained at home and hired others to sail his ships.

But these rich merchants were not all honest. Sometimes they entered harbors to steal slaves or to destroy the cities. Sometimes they attacked the ships of other traders. They killed the sailors and stole their goods. They became pirates.

The Cretan pirates were brave and bold. They were not afraid of the storms. They did not mind the cruel waves of the Mediterranean Sea. They did not fear the rocks along the shores. They did not fear the sailors of other countries. Were not their ships the swiftest of all the ships on the sea? Were not their weapons strong and sharp and their sailors brave and fierce?

After a while, the merchant sailors of Crete came to be feared by everyone. People no longer wanted them to sail into their harbors. They did not want to buy from them. They ran away when they saw a Cretan ship coming near.

The Cretans had become rich and comfortable. They had become the masters of the sea. They had taken trade away from the merchants of other countries. Their men had the best spears and the best knives that were made. Their women had the most beautiful ornaments that could be found. They had comfortable homes. They had fine dishes, furniture, and rugs in the homes. They had bathrooms, too, almost as good as those we have. The kings lived in beautiful palaces. The priests had rich temples. The Cretans loved their ease and comfort.

But in time their great civilization disappeared. Their beautiful cities and ships were destroyed

by enemies. Their people fled to other countries. Soon the glory of the little island of Crete was forgotten. Thousands of years went by. So many things happened that, at last, even the memory of Crete's greatness was lost.

A few years ago people began to dig among the ruins where the cities of Crete had stood. They found many interesting things which have told them the story of her power on the sea. Many records, too, have been found among the ruins of these old cities. So far no one has been able to read these records. No one knows what the symbols mean. Perhaps some day the way to read them will be discovered. Then many wonderful stories will be told of what happened long ago in Crete.

Reading More about Crete. I. The Cretans had many wonderful craftsmen. There is a story that one of these great builders made an airplane and flew away from the island. You can read this story in the book *A Child's Book of Myths*, by Margaret Evans Price. Look in the Table of Contents for the story, "Daedalus and Icarus."

II. There are stories about the sailors of Crete and their power on the sea in the book *Inventions and Discoveries of Ancient Times*, by William L. Nida. Look in the Table of Contents for these stories: "The Great Festival," "Minos Loses Control of the Sea," "Jakaray, the Cretan Pirate," and "Jakaray Discovers Spain."

III. Another interesting story about the Cretans is in the book *Greeks and Persians of Long Ago*, by Louise M. Mohr, Carleton Washburne, and Willard W. Beatty. It is called "A Half-Forgotten People of Long Ago." Find the story in the Table of Contents.

Life in Crete. Perhaps a group could plan some way to show the kind of life the Cretans led. Could this be done by making a model of the island on the sand table, with the people at work and play and living in their homes?

Or could you plan a motion picture which would show the interesting life of the Cretans? Decide: (1) what pictures you want; (2) who is to make them; (3) how you will show the pictures; and (4) who is to explain the pictures.

Cretan Sailors. I. Imagine yourself a Cretan sailor who has just returned home from a trip to Egypt. Write a story in which you tell of some adventures you had there.

II. Make a picture showing a sea fight between the Cretans and pirates. Try to make your picture correct as well as interesting.

V. THE GREAT PHOENICIAN TRADERS

For a thousand years the Phoenicians were the greatest traders on the Mediterranean Sea. With whom did they trade? How did they help to make a better civilization?

A COUNTRY BY THE SEA

Phoenicia was a small country. It was a narrow strip of seacoast at the eastern end of the Mediterranean Sea. The Lebanon Mountains shut it off from the country to the east.

Imagine that you are a Phoenician boy or girl living back in the time of our story. What would you see if you should travel from the sea to the mountains?

First, you would see the seashore itself. Lap! Lap! Splash! Swish! The waves would wash up over the yellow sand and then run back to the edge of the water. Lap! Lap! Splash! Swish! All day and all night it would be much the same.

Then, as you left the shore, you would see small gardens with melons, radishes, cucumbers, and onions growing in them. These gardens would be all along

the strip of rich level land near the coast. It would not take you long to walk through this level garden.

Next, you would begin climbing up the gentle slope of the first hill. On this slope you would see olive groves and grapevines and orchards full of apricots or peaches or plums or other fruit. As you walked, the slopes would grow steeper. Up, up, up, you would climb until you reached the top. Your path would wind back and forth across the hillside. That would make it easier to climb the steep hill.

When you reached the top of the hill, what would you do? Nothing but go down the other side to the bottom again. As soon as you were down that slope, you would begin to climb another. Up, up, up, you would go until you reached the top. Then down, until you reached the bottom. As you traveled you might sing a little song like this one :

THE SONG OF THE UPS AND DOWNS

There is no place to go but up, up, up !

There is no place to stay but down !

There is nothing but valleys and mountains and cliffs,
In country, or city, or town.

If you wish to walk, you climb.

.If you wish to run, you slide.

There is no other way to get over the land,
But to climb to the other side.

Up the steep slopes and over the top,
 Then down to the valley below.
 If you wish to go farther, start climbing again!
 There is no other way to go.

So climb up the mountain, and slide down the slope,
 'Till you reach the seaside town.
 There is no place to go but up, up, up!
 And no place to stay but down.

That song would give people a very good idea of what the country of Phoenicia was like.

So, you see, the Phoenicians had little but the sea. For that reason, many of them became fishermen, sailors, and traders. The great sea taught them to make a living from it. It taught them to build swift ships and to sail them. It taught them how to carry products to other places. After the Cretans lost their sea power, the Phoenicians were the most important sailors and traders in the world.

A Land of Ups and Downs. Perhaps you could show on the sand table how you think Phoenicia looked. Could you show the rocky coast and the high cliffs and the mountains? Could you show the forests and the tiny farms? Could you show the mountain villages and the seaport towns? Make a model of how you think the country may have looked.

Phoenicia and the Sea. Write a paragraph telling how the sea invited the Phoenicians to be sailors and how it taught them to be good seamen.

EARNING A LIVING IN PHOENICIA

Every boy in Phoenicia hoped that some day he would sail out over the Mediterranean Sea. He wanted to visit those faraway places he had heard about. To him the sea meant new adventures and new people. It meant riches and a good time.

The sons of the potters dreamed of carrying cargoes of beautiful vases and jars to Egypt. The sons of the metalworkers dreamed of making trips to get cargoes of metal. The sons of the shipbuilders dreamed of the galleys they would build and of the trips they would make in them. All the boys planned to go to sea as soon as they were old enough.

Many of these dreams came true. The sons of the potters did carry their vases and jars to other lands. The sons of the metalworkers did go in search of new metals. They went to Britain for tin, to the Black Sea for iron, to Cyprus for copper. From these metals the workers at home made new and better tools. They sold them to the workers all over the world. ~~The~~ sons of the shipbuilders made ships which were more and more beautiful. ~~They~~ made them larger and swifter, too. In these ships the Phoenician sailors carried things all over the Mediterranean Sea. They became great traders.

Phoenician boys made their first sea trips when they were twelve or thirteen years old. The sons of captains went with their fathers. Sailors took their own sons or the sons of their friends. Everyone who could went to sea.

But all of the Phoenicians could not leave their little strip of seacoast and sail away with the traders. There was work at home to do. Some caught fish. Some cared for the fruit crops or raised grain and vegetables. There must be food for the people to eat. Some cut down the trees on the mountains for the traders to sell or for the craftsmen to use. Some built the ships. Some watched the herds of sheep and goats and cattle. Many of the people made beautiful articles for the traders to sell all over the world. In such ways as these, the people of Phoenicia earned a living.

Some of the people lived in tiny villages perched on the hillsides or hidden in the valleys. From these villages the farmers went to their fields each day, just as the Egyptian farmers did. From them went other workers, too. The hunters went into the mountains to trap and kill the wild animals. The woodcutters went to their work in the forests. The shepherds went to care for their flocks on the hillside pastures.

Most of the craftsmen lived in the big cities of Tyre and Sidon, and in the other cities along the seacoast. Next to the sailors and traders, the craftsmen were the most important workmen of Phoenicia. They made the things which the traders sold.

The craftsmen worked in little shops. These workshops took the place of our factories. But they were different from our factories in two ways. First, they were much smaller. Second, they had no machinery. Everything was made by hand, with the help of a few crude tools.

The craftsmen of Phoenicia did their work and sold their articles in the same shop. Sometimes they used the same room for making and selling. Often the whole family worked in this little room. Many of the craftsmen who were masters at their work had other men working for them. The workrooms were small and dirty and dark. They were not pleasant places in which to work.

The craftsmen of Phoenicia were good workmen. They turned the common things about them into beautiful objects. They gathered sand on the seashore and made glass. It was almost as delicate and beautiful as the glass made today. From the clay on the hillsides they made bowls and vases and lovely

blue porcelain dishes. They cut down trees from the mountains and carved beautiful pieces of furniture from the wood. They raised flax on their hillside farms, spun this flax into delicate threads, and then made beautiful linen clothing. From tiny shellfish along the shores they made a dye that was famous all over the world. They found tiny stones on the mountain paths, set them in gold and silver, and made ornaments and jewelry that people everywhere wanted.

Like the Cretans, the Phoenicians were eager to learn from everyone. As they traded with other countries, they found many ideas to copy. Sometimes they used the ideas without changing them. Sometimes they improved them by adding ideas of their own.

Many of their best ideas came from Egypt. The Egyptian craftsmen were the first to learn how to make glass. The Phoenicians learned how from the Egyptians. They made glass that was even better in some ways than the glass of the Egyptians.

The Babylonians, too, showed the Phoenicians how to make many things.

The Phoenicians themselves became the teachers of other groups of people. Craftsmen from Phoenicia went to work in places around the Mediterranean

Sea. They taught the people they found there how to make things. Soon the crafts that had been known only in the cities of Egypt, Babylonia, Crete, and Phoenicia were known to all the parts of the world that were known then.

In this way the Phoenicians helped to spread civilization. They taught people how to trade. They taught them how to make beautiful and useful objects from the common things about them. They taught them how to live better.

Earning a Living. Make a list of the different ways in which the Phoenician people earned a living. The people seemed to like some of these ways better than others. Which three ways did they seem to like best? Place a star before each one. Which of these ways of earning a living do you think you would have chosen if you had been living in Phoenicia at that time?

The Craftsmen of Phoenicia. I. How did the craftsmen of Phoenicia learn to make the articles they sold? Did they find out for themselves how to do these new kinds of work? Were they taught by others? If they were, who taught them?

II. The craftsmen used the things they found about them for making the articles they sold. Make a list of the materials you think they used. Opposite the name of each kind of material write the names of all the articles you can think of that can be made from that material. Place a cross on the list before each article which the

Phoenicians made. Study your list to see whether the Phoenicians made as good use of the common materials as we do. For example, did they make as many kinds of things from sand as we do? From metal? From clay?

III. Make a model showing a shop such as the Phoenicians had, in which they made and sold the articles of their craft.

BUILDING THE SHIPS

The shipyards of Phoenicia were busy places. The merchants needed many new ships. Their old ones often had to be mended. Sometimes the Phoenician shipbuilders made ships for people of other countries, too. The shipyards of Tyre and Sidon, two seaports of Phoenicia, were the largest and busiest in the world. Nobody knows how many thousands of boats were made in those shipyards.

All kinds of ships were made. There were small boats for the fishermen. There were galleys, both biremes and triremes, for the traders. There were war galleys, too. A Phoenician bireme is pictured opposite page 269.

Each shipyard was under the charge of a master. He made the plans for building the new ships. He told all the workers what to do. He told them how to do their work. He had charge of the supplies.

The wood the workers needed for building the ships came from the Lebanon Mountains. Cedars and

firs were used most. Sometimes the acacia tree was used, too. The keels and oars were made of oak. Large piles of lumber of different sizes and shapes lay ready for the carpenters to use.

The shipbuilders had no machines such as we have now. Their tools were made of wood, stone, bronze, and iron. They had mallets and hammers for pounding. They had adzes and axes for cutting. The ships were put together with treenails. These wooden pins fitted into holes made for them in the lumber. Shipbuilders still use treenails to put wooden ships together. They have never found anything better.

The ships were built inside a wooden frame called the *ways*. The ways held the ship in place while the carpenters were working on it. When the ship was finished, it could slip into the water easily from the ways.

The first thing the shipbuilders did in making a boat was to lay the keel. Posts were fastened to the keel at the stern and the prow of the ship. The ship's ribs were fastened to the keel between the posts. These parts made the frame of the boat.

Making the frame of the ship was the most important part of shipbuilding. The ship was likely to break apart in a storm if the frame was too long or

if the ends were too high. Water came in if the sides were too low. The ship would not balance evenly if the ribs on opposite sides of the ship were not shaped exactly alike. Each part was carefully measured and shaped in order to make the ship swift and strong, and give it plenty of room inside. The wood used in making the frame was soaked or steamed in order to make it soft. When it was soft the wood could be bent easily into the shape that the carpenters wanted.

The carpenters made holes in the frame at the places where the outside boards were to be fastened. They also made holes in the boards that were to cover the frame. Then they steamed the boards to make them soft. Finally, several men held the long boards in place while the carpenters pounded the treenails into the holes.

The carpenters worked on the inside of the boat after they had finished covering it. They built the *hold*, or the place for the cargo. They made decks and seats for the oarsmen. They made platforms at each end of the boat for the lookout and the master of the oarsmen to stand on. They made the mast from a young, straight tree. They carved the head of an animal or of a woman on the prow of the boat. This was called the *figurehead*. They

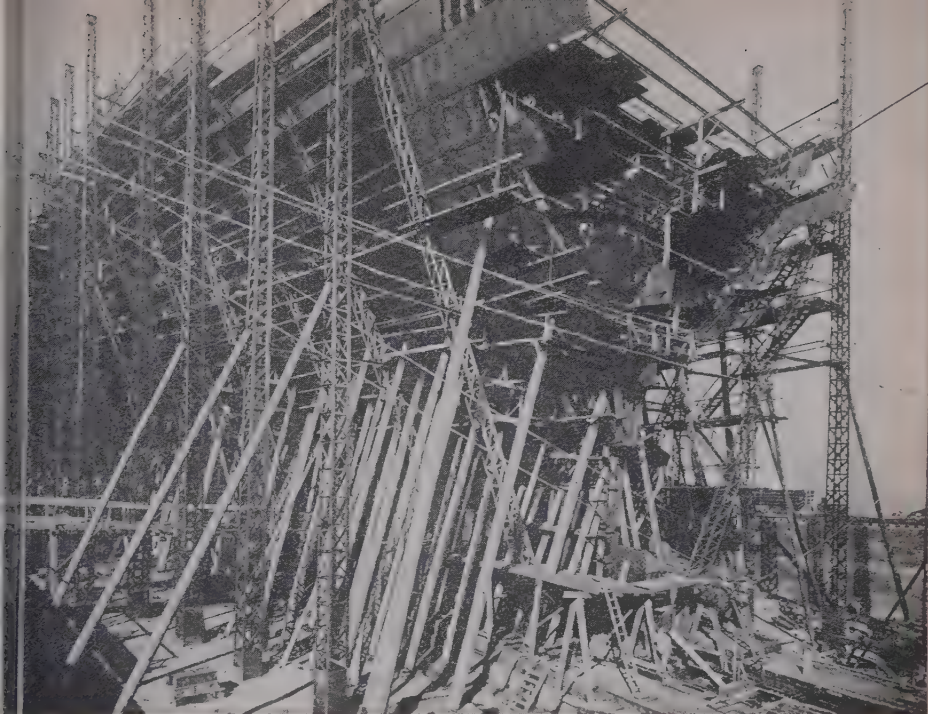
made oars, too. Some were short. Some were long. They were all thick and heavy.

Other workers helped finish the boat after the carpenters had built it. Workers called *calkers* filled the cracks in the sides and bottom with wax or pitch. That kept the boat from leaking. The painters put bright colors on the ship so as to make it gay and beautiful. They painted its name on the side. The sailmaker placed a linen sail on the mast.

At last, the ship was finished. It was ready to be placed in the water. This is called *launching* the ship. Sometimes the owner invited his friends to see the launching. The shipyard master, the workmen, and the crew were all there, too.

The workmen greased the ways, so that the ship would slide over them easily. Then they took out the blocks of wood that held the ship in place. Gently they pushed the ship down the ways. It moved slowly at first. Then it went faster and faster. Finally it slid into the water with a great splash. It was ready to sail. Look back again at the beautiful Phoenician ship opposite page 269.

The Phoenicians made their ships in this way for many centuries. They taught other people to make ships in this way, too. The Greeks and Romans probably learned from the Phoenicians. Ships are



Courtesy French Line

IN A SHIPYARD OF TODAY

still built in about this same way. The picture above on this page was made in a shipyard of today. You can see a great ocean liner on the ways. Steel plates instead of wood planks are being used to make this ship. Steel rivets are being used instead of treenails to hold the ship together. But the way of building the ship, from laying the keel to the final painting and launching, is still very much the same way that was used by Phoenician shipbuilders many hundreds of years ago.

The chief difference now is that metal is often used instead of wood. Thousands of tons of steel are sometimes used to build one ship. Better tools and machines are used, too, in making ships today.

Shipbuilding. I. Find pictures of shipyards of today. Study these pictures to find how they are like the shipyards of the Phoenicians. How are they different?

II. Make a set of pictures of a Phoenician shipyard, as you imagine it. Show: (1) the building of a frame for a ship; (2) the ways; (3) the launching of a ship; (4) the workmen decorating a ship.

III. Write a paragraph explaining why the Phoenician shipyards were busy places.

SAILING AWAY!

The Phoenicians took many sea trips, long ones as well as short ones. Sometimes they were gone two or three years. They went farther than any other sailors had gone before that time. They went west to the end of the Mediterranean Sea. They sailed out into the Atlantic Ocean. They went up the coast of Europe and discovered Britain.

The Phoenicians did not let anyone know just where they went on their sea trips. When a ship sailed out of a Phoenician harbor, only the master knew where he and his men were going. The sailors could not tell even their families when they would

return. The Phoenicians were afraid other people would take their trade away from them. That was why they kept their sea roads secret.

Tin was one of the most important cargoes the Phoenician traders carried. Their craftsmen mixed it with copper to make bronze. From bronze they made knives and tools. The Phoenicians had found tin mines in Great Britain. Of course, they did not want other people to find those mines, too. If they did, it would ruin the trade of the Phoenicians. So the Phoenicians would not tell even their own families where these mines were, or where they were going on their trips.

Sometimes it took several days to get ready for a long trip. The ship might need mending. Perhaps the cracks in the sides and bottom of the boat needed to be calked again. Perhaps the ship needed a new sail or new ropes.

Then, too, the trader had to buy the goods he was going to sell. He needed to choose carefully. Often he would go from shop to shop in Tyre or in Sidon, buying things he thought people across the sea would like. He knew that people who were hungry would buy food — grain, olives, dates, and jars of honey. He knew the women would want vases, pots, jars, and bowls for their homes, and pretty ornaments

to wear. He knew that the men would want weapons and tools. He knew that children would want toys. So he bought many things like these to take on his outgoing trip.

Next, the ship had to be loaded. The cargo needed to be kept dry. It had to be packed carefully, so that nothing would break or spoil. It had to be arranged in order, so that each article could be found when it was needed. It had to be placed where it would not be in the way of the sailors as they did their work.

At last, when the cargo was packed, the ship was ready to sail. The men were starting on a great adventure. Perhaps they would not return to Phoenicia for many weeks, or even for years. Perhaps there would be terrible storms, and the sailors would fight the wind and the waves. Perhaps there would be pirates to fight. Perhaps the ship would sail too close to the rocks and be wrecked on some lonely coast. Perhaps the ship would be swallowed up by one of the terrible sea monsters that men of that time imagined to be in the ocean! Every captain, then, felt that this trip out of his home harbor might be the last one he would ever make.

The Phoenician traders were important people. In every seaport people were glad to see them come.

But this was not merely because they had things to sell. Often people were glad to see them because they wanted to hear the news.

"Well, what is the news?" an Egyptian metalworker might ask.

"The people along the Black Sea have discovered iron," was the answer of the Phoenician trader.

"We must have some of it," the metalworker might answer. "How can we get it? Will you bring some the next time you come to Egypt?"

That gave the Phoenician captain still more trade.

So the Phoenicians gathered the news at each place where they stopped and took it on to the next place. They carried letters from one city to another, too. If they could not carry these letters all the way themselves, they passed them on to someone else to deliver. The Phoenicians also often carried cargoes and passengers in their boats from one land to another.

But the time came when the Phoenicians lost their sea power. The Greeks began to make stronger ships, faster ships, and more ships. They began to get more and more trade. At last, the Greeks ruled the seas. This seems too bad, because the Phoenicians had helped to teach the Greeks to be traders. They had taught them how to make things to sell to

others. They had taught them how to make ships to carry their goods in and how to sell things.

The Phoenicians never became a great nation. They were not interested in conquering other nations. They had no armies, no rich lands, and no mighty kings. Each city ruled itself. The people were merchants and were interested only in buying and selling.

But the Phoenicians had carried civilization from one place to another. They had taught people how to make things. They had taught them to write. They had taught them to trade. They had taught them how other people lived. For these reasons they were important people, and they were never forgotten as the Cretans were.

The Sailors of Phoenicia. I. The Phoenician sailors probably sang many songs while on their long trips. There may have been gay songs and sad songs. Can you make up a song such as the sailors might have sung? It might be a song to sing when the sailors were rowing their boat at sunsét. It might have been one to sing when they were leaving the harbor to be gone for months or when they were nearing home after a long, hard trip.

II. Perhaps you would like to make a model of a Phoenician boat from clay. You might make a cargo boat and make some of the cargo you think Phoenician sailors would have put on it.

VI. THE SEA ROADS GROW LONGER

As the years went by, sailors began to go farther out upon the sea. As they did so, they lost some of their fear. They learned to understand the sea better. They were able to sail farther and farther away. How did this change the world?

HOW BRAVE MEN EXPLORED THE WORLD

What you have read about the Egyptians and Cretans and Phoenicians took thousands of years to happen. During all this time, the sailors had not dared to sail straight out from the shore, out upon the great ocean. For centuries they went no farther than to the end of the Mediterranean Sea. They were afraid to go through the narrow gateway of that sea and beyond to the great Atlantic Ocean. Can you find that gateway on the world map inside the covers of this book and on the map on pages 244-245?

At last, some sailors did become bold enough to go through this gateway. Some sailed up the coast of Europe. Some sailed down the coast of Africa. Sailors returning from these trips told of fierce sea

monsters which they had met. They told tales about how these huge beasts swallowed whole ships — sailors and all! They told tales about seas so hot that the water boiled. They told tales of birds so large that they could pick up a ship and carry it away. They told of islands where the people were unfriendly and fierce, and where sailors had been cooked and eaten.

The sailors also told of a place they called the "jumping-off-place." At that time people thought the earth was flat. The jumping-off-place was supposed to be the edge of the earth. The sailors said that if a ship sailed too far, it would go straight over the edge and never come back.

Of course these stories were not true, but people believed them. Merchants were afraid to send ships far out on the ocean for fear they would never return. Of course, if people had understood more about the ocean, they would have known that such stories could not be true. But they did not understand the ocean at all. It was all a strange, unknown part of the world.

But there were some other dangers that the sailors had a right to fear. The sailors knew about these real dangers. They had seen them, and they had suffered from them.

First, there were the pirates on the sea. These pirates were fierce and cruel men, and their boats were swift and well armed. The pirates made their living by running down the traders, stealing their cargoes and boats, and killing the sailors. Sometimes they did something still worse. They sold the sailors as slaves.

The sailors were afraid of storms, too. The ships in those days were small. They could not fight the waves as the great ocean steamers of today can. So the sailors did not go very far out but always kept close to the shores. But this was dangerous, too, because the winds would drive the ships upon the rocks and dash them to pieces.

It was not strange, then, that men did not go far from home. Even in those days people did not wish to run into danger unless it was necessary. So the sea roads were short roads for thousands of years.

You have read that, as time went on, the sailors wanted larger ships. There were more people upon the earth, and that made more trade. Men needed faster ships and larger ships to carry bigger cargoes. So they set to work to make larger and better ships.

They improved the shape of the ship, so that it would cut through the water more easily. They gave the ship more masts, and larger ones. They fitted

these masts with all kinds and shapes and sizes of sails. They no longer needed oarsmen, for these larger ships were too heavy to be moved by oarsmen.

With better ships the sailors became bolder. They sailed straight out upon the ocean. Some went to find a strange land about which they had heard. Some went in search of gold or silver. Some went just for the fun of exploring.

Christopher Columbus was one of these brave sailors. On the opposite page you can see the kind of ships he used for his exploring. He found a huge new land — the continent on which we now live. He discovered the whole western half of the world. Find this part of the world on the map inside the cover of this book.

What a surprise that discovery must have been to the people living in the world then! They had been living upon only half the earth and thinking it was all of it. They had been thinking that the Mediterranean Sea was the center of the earth, and that Europe, Asia, and Africa were the whole world.

So, at last, people found out what a huge place the earth is. They discovered its great oceans and its great lands. They found hundreds of smaller seas and smaller lands. They sailed clear around the world and came back to their starting place. That

THE SHIPS OF COLUMBUS



made them know that the earth is round like a ball. Was that not a wonderful discovery to make?

All this happened only a short time ago. It is less than five hundred years since America was discovered. It is less than five hundred years since it was proved that the earth is round.

This great change took place because men had learned to make boats. You see, then, that the early shipbuilders were among the most important people who ever lived. Without them, people might still be thinking that their own river valley or their own island or their own strip of seacoast was the whole world. If it were not for the shipbuilders, people might still be using only a small part of the earth.

Dangers at Sea. Make some pictures that show some of the things which the sailors feared in early times. You can find what some of these were by looking at old maps. Show both the real and imaginary dangers.

Learning about the Great Explorers. I. Find the name *Christopher Columbus* in the Index of each of the different reading and history books which you have in your classroom. You will probably find several stories about him, for he was an important man. Many people have written stories about him. On a piece of paper write the title, the name of the author, the name of the story, and the pages of each book in which you found a story about Columbus.

Read as many of the stories on your list as you can. Find out: (1) the route taken by Columbus in his search for the East; (2) the places he really found; (3) the dangers he met; and (4) the results of his trip.

II. You will be interested in reading stories about other explorers who took great sea trips, too. Here is a list of a few of the men who have helped us learn how large the world really is. Can you find the sea road followed by one of these explorers on the map on pages 244-245?

Henry Hudson

Fernando Magellan

Leif Ericson

Sir Francis Drake

Vasco da Gama

Richard Evelyn Byrd

Choose one or more of these names and for each one make a list of readings, as you did for Columbus. Read the stories on your list and tell the class the interesting things you find out.

Strange Parts of the World. There are some parts of the earth which we know about but do not use. Can you find out where some of these places are?

CLIPPERS AND PACKETS

The ship which Christopher Columbus sailed in from Spain to America was a sailing vessel. The ships which carried other famous discoverers and explorers to America were sailing vessels.

These early sailing vessels were slow and frail and small. But they were the best ships that men had learned to build up to that time.

At first these sailing vessels were all made in Europe. Then America began to build ships, too. She had great forests from which she could make strong hulls and tall masts. She had skillful craftsmen who could easily learn the art of shipbuilding. She had good harbors that made excellent places for shipbuilding. American shipbuilders learned to make the best sailing vessels in the world. Traders from other nations sent to America to have their ships built, just as the people of early times had sent to Phoenicia for ships.

At first America made her ships just like the ships of Europe. But in time she changed them to make them larger and swifter. But even these larger ships were slow and clumsy. It took weeks for one of them to cross the ocean.

Finally American shipbuilders learned a better way to make sailing vessels for travel. They called these ships *packets*. Packets were very fast sailing vessels.

The packets sailed at regular times from the great seaport of New York. They made the trip to Europe in from sixteen to twenty-three days. People thought this was very fast sailing. Other ships took three times as long to make the same trip. So everyone who could do so traveled in an American packet.

The packets had staterooms, or bedrooms, and dining rooms and decks for the passengers to use. They carried mail. But these packets had little room for cargoes. Fast freight ships were needed, too.

A man by the name of Isaac McKim decided to make a fast-sailing freight boat. "If the packets can go fast, there is no reason why freight ships cannot be made to go fast, too," he thought. So he built a ship much like the packets, only larger. Instead of rooms for passengers, there was more space for cargo. He named his ship the *Anne McKim*. She was the first of the ships called *clippers*.

The *Anne McKim* was such a good clipper ship that other people wanted to have clipper ships, too. The clippers were so fast that the Americans carried many cargoes for other nations. More and more clippers were built. Some were sold to people of other nations. Many were used by the merchants of America.

The story of the clipper ships is an interesting one. Sometime you will want to read more about them — the way they were built, the cargoes they carried, the men that sailed them, the great races that the different ships had. It is too long a story to tell here. Three typical clippers are shown in the picture on the next page.



Courtesy First National Bank of Boston

CLIPPERS

The clippers "spread more canvas" than any of the earlier sailing vessels. How did that help their speed?

There are only a few sailing ships carrying cargoes today. Most of the freight is carried on steamships now. Most of the passengers are carried on steamships, too.

Sailing Vessels Today. Why do we not have clipper ships and packets today? Would it not be cheaper to let the wind blow the ships from port to port than to use huge engines that burn coal or oil?

Something to Read About. Here is a list of topics that you will enjoy reading about:

1. The story of the *Anne McKim*.
2. The race of the tea ships from China.
3. How much coal or oil a freighter of today burns in a trip across the ocean.
4. How the steamship took the place of the clipper.

Choose the topic which sounds the most interesting to you. Look in your histories, geographies, and other books to see what interesting facts you can find about your topic. Be ready to tell the class when you find out.

SHIPS OF TODAY

Finally the steamship was invented. The steamship was run by a steam engine.

At first, steamships were not so fast as the clippers. They cost more to run because they burned much coal. The engines sometimes got out of order, too. The first engines that were used were not very good.

But, in time, the steamships were so much improved that they were faster and safer than the clippers.

Today a great deal of the world's freight is carried by *tramp* steamers like the one in the picture opposite. They are called tramps because they do not follow a regular course. The tramps go from place to place, wherever they can get a load to carry. They carry lumber, iron, grain, coal, or other products from port to port.

Perhaps a tramp steamer takes on a cargo of coal at Philadelphia which she carries to Halifax, Nova Scotia. At Halifax perhaps she takes on a load of fish which she carries to Rio de Janeiro, in Brazil. At Rio de Janeiro she may load up with coffee, which she takes across the Atlantic Ocean to Amsterdam, in Holland. After unloading the coffee at Amsterdam, the tramp may get a cargo of chocolate for Ceylon. To get there, she goes through the Mediterranean Sea, the Suez Canal, the Red Sea, and across the Indian Ocean. At Ceylon the tramp may load up with tea which she takes to Seattle.

So the tramp steamers go from port to port. They are free to do whatever work needs to be done, to pick up cargoes of freight wherever they find them. The crews may get back to their home ports a month or two after they leave them; or they may not get



Courtesy First National Bank of Boston

A TRAMP STEAMER

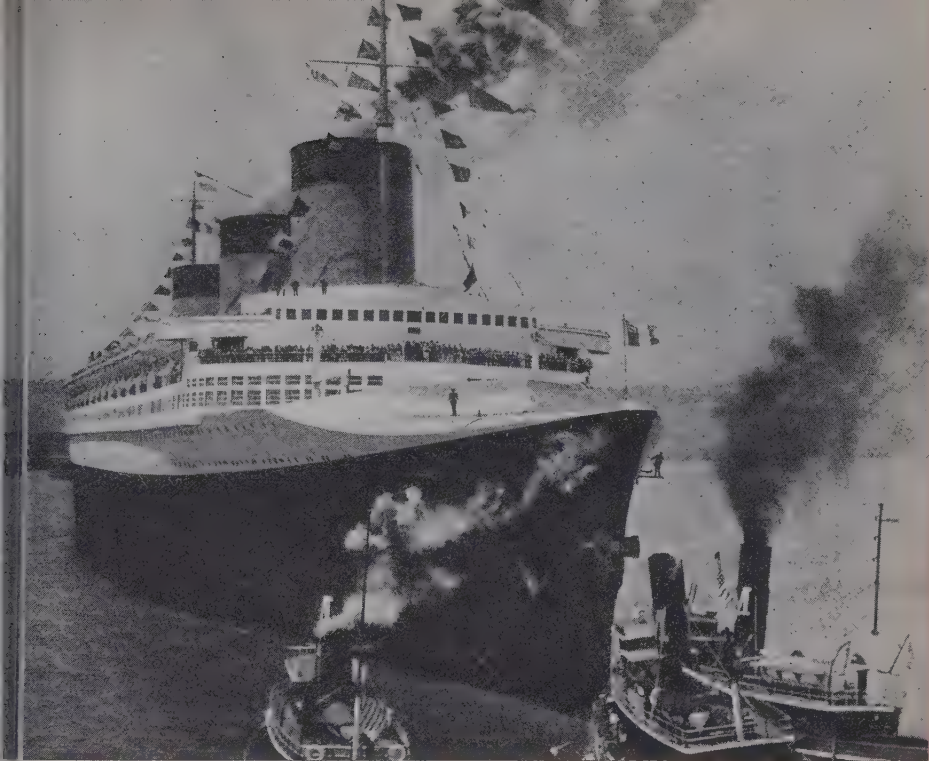
back for three or four years. The sailors on tramp steamers never know when they will return from a trip.

But not all the freight of the world is carried by the tramps. More and more, it is being carried by the *liners*. The liners are ships that sail back and forth between certain ports. They make their trips at regular times, carrying passengers and freight.

A liner may sail between Seattle and ports of China. She leaves Seattle on a certain day. She arrives at Yokohama in Japan on a certain day. She unloads the passengers and freight which she has for that city. She reloads with other passengers and freight. She sails for her next port, Hong-kong, arriving there on the day she is expected. When she reaches Hongkong, she unloads her cargo, reloads, and starts back for Seattle. She arrives the day she is expected. See whether you can show her whole trip on the map on pages 244-245.

A liner must keep a regular time for leaving and landing. She must be as regular as a train. Every hour that she is late means a loss of thousands of dollars to the owners of a liner.

The liners are usually larger and faster than the tramps. They are used for carrying freight that must be moved quickly. Bananas must travel



Courtesy French Line

AN INCOMING PASSENGER LINER

Here is a big ocean liner coming into dock. She has to shut off her own engines and be towed in by small tugs. Why? It takes several tugs to do this work for a large ship. The tugs have to push and pull and shove until they get the ship into the place where she is supposed to go. A tug master, who stands on the deck of the large ship, directs the dangerous work of bringing the liner into dock.

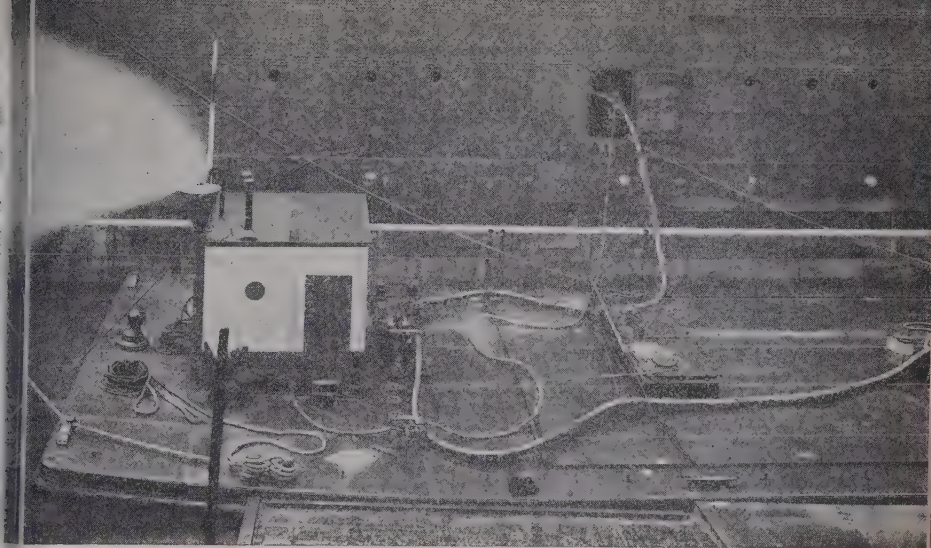
To protect the liner from harm as the tugs shove against her sides, the tugs have big pads of rope on their bows and sides.

quickly, for they will spoil if they spend too long a time on the way to market. So they are brought from Central America by liners. The banana growers know when the ships will arrive. The fruit is picked and ready when the boat comes into the harbor. No time is wasted. Quickly the cargo that the ship has brought is unloaded, and she is loaded again with a cargo of bananas. In a few hours she is ready to sail back to the port from which she came. You can see that it would mean a great loss if the liner were a day or even a few hours late.

Passengers usually travel on liners. Only a few are carried by tramp ships. Some liners carry a large cargo and only a small number of passengers. Other liners carry many passengers and only a little freight. Some passenger liners are like floating hotels.

Many people think that ships will never be very much larger than the biggest ones of today. Already ships carry thousands of people. Larger numbers of people traveling together would be hard to take care of. Besides, larger boats could not pass through one of the important sea roads, the Panama Canal, and they could not go into some of the harbors.

Perhaps in a few years it will cost less than it does now to travel by ship. Then perhaps anyone who wants to will be able to travel that way.



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REFUELING A SHIP

The picture above shows how a liner is filled with oil. The oil is used for fuel in place of coal.

Think what such a change would mean for everyone. Think how much we could learn from people of other countries. Think how much they could learn from us. What fun it would be to visit friends in France, in China, in India, or in Australia! Perhaps there would be less quarreling if the people of different countries knew one another better. Perhaps there would be fewer wars.

Modern Ships. I. How are the ships of today loaded and unloaded? Perhaps a group from your class would be interested in making a motion picture showing the loading and unloading of a modern ship. Use bright,

strong colors for the pictures. Plan a way of showing them. Who will make the talks that explain the pictures? You might have several pupils prepare talks for each picture and then choose the most interesting talk to be given with the picture.

II. What have the shipbuilders done to make their ships safe? To make them convenient? Comfortable? Safe? Talk these questions over in class.

III. Choose one of the newest and largest liners on the Atlantic Ocean. Find out: (1) how long it took to build the ship; (2) how large the ship is; (3) how many people it takes to run the ship; and (4) how long it takes the ship to cross the Atlantic Ocean.

IV. Do you think that a ship of today can be called a moving bridge? Why? Do you think there are real waterwalls today? Why?

BUYING AND SELLING GOODS

From the stories which you have been reading, you can see how ships have conquered the seas. You can see how ships have helped make our present civilization. Ships have helped people to find new ways of living. They have helped people to learn new ways of working. They have helped people to learn new ways of thinking about government, religion, and education. They have made it possible for people living in different parts of the world to understand one another.

At one time, as you know, the people of a country raised their own food and made the things they needed. Later, they raised more food and made more products than they used. Then they sold some of these things to people of other countries who wanted to buy them.

England makes more cotton cloth than she uses to clothe her people. She sells the cloth to people in other countries who cannot make cloth. But England cannot raise all the wheat her people need to eat. So she buys wheat with the money she gets from the cotton cloth which she has sold.

Holland makes a great deal of cheese — far more than her people can eat. She sells the cheese to people in England and buys cotton cloth from them. She sells cheese to the people of the United States of America and buys machinery from them. She sells cheese to the people of China and buys silk fibre from them.

Russia has large wheat farms. The people of Russia do not use all the wheat they raise. So they sell part of their wheat to other countries. They use the money they get to buy machinery from the people of the United States of America, or to buy clothing from the people of England, or to buy rubber from the people of Africa.

Our country buys from nearly every country in the world. We buy bananas from countries in Central America. We buy tea from China and coffee from Brazil. We buy rubber, diamonds, ivory, silk, and dozens of other things.

How do we pay for all of these things? We pay for them with the money we get by selling our products, such as cotton and wheat and oil and machinery and books, to other countries.

Such selling and buying is called *trade*. The trade which one country carries on with other countries is very important to her people. It gives the people better things to eat and to wear. It gives them better houses to live in. It gives them better tools to work with. It gives them more money to spend and better ways of spending their money.

Trade among countries is possible today because we have large ships which can carry goods from one country to another. Most of the ships upon the great sea roads are used for carrying on trade between the countries of the world.

There was a time when Norway could not trade, for she had to use everything she had for her own people. She did not have food to sell, nor lumber, nor clothing, nor machinery, nor minerals. She could not buy from other countries, for she had

nothing with which to pay for the goods. What was she to do?

Norway has solved her problem by selling the services of her boats and of her sailors. She has wonderful ships and many brave seamen. She carries goods for other nations. She builds fast ships. She trains men to sail these ships. Norway has become a great trading nation, just as Phoenicia had been a trading nation thousands of years before. Norway sells the services of her ships and of her sailors to the people of other countries who do not have enough ships to carry their goods. This gives her money to buy food and clothing and machinery and all the things she needs.

Sending goods out of a country is called *exporting*. Norway exports the services of her ships and her sailors. England exports cotton cloth. Holland exports cheese. The United States of America exports machinery. The goods which a country *sells to* others are called *exports*.

Bringing goods into a country is called *importing* them. England imports wheat for her people to eat. Holland imports cotton cloth. Russia imports machinery. The United States imports silk thread to make into cloth. The goods which one nation *buys from* another are called *imports*.

Some countries have many things to sell, but they do not want to buy goods from others. That is because they can raise or make nearly all the things they need. Such countries want to export goods, but they do not want to import goods. That is selfish and unfair.

Suppose that our country has grain and oil and machinery and cotton to sell. The merchants of our country want to sell these things to the Dutch who live in Holland. The Dutch would like to buy those things, too. They need them. But to get money to pay for them, the people of Holland would have to sell cheese and chocolate and butter to this country.

Now suppose that the people of our country refuse to buy cheese and butter and chocolate from Holland. She will have to sell her goods in other countries, or she cannot buy the products she needs. Do you think Holland will want to buy from us if we do not buy from her? Do you think we would be able to have trade with Holland? How can Holland buy goods from us if we do not help her to make money by buying goods from her?

You can see that trading is not just selling goods. Trading means *exchanging* goods — selling and buying. People must be fair about trading, just as boys and girls must be fair in playing games.

People must remember that the exports of a country and the imports of a country must be about equal. If each country could buy about as much goods as it sells, there would be better trade among all the countries. Then the people of the world could live better than they have ever lived.

By making ships, men conquered the seas. By making ships, men have built up trade among the countries. The waterwalls are gone. But there is still a problem about trade. We have to find a way of trading that will help each country to buy and to sell as much as it needs to in order to make its people comfortable. We have to find a way of giving every country a chance to take its part in the world trade.

Trading Together. I. We send many kinds of goods to other countries. Find out some of the kinds of goods which we send out of the country. Your geographies will help you. Make a list of our exports.

II. We buy goods from other countries. Name some of the countries from which we buy. What are some of the kinds of goods we buy? Make a list of our imports.

III. Explain why we should be willing to buy from other countries if we wish to sell to other countries.

IV. Explain in what ways the people of Norway are like the people of Phoenicia.

V. Why does trade help make people civilized?

THINKING BACK

Men have had a long struggle with the sea. Did you enjoy the story of that struggle? Tell one another about the parts of the story you like best. The questions on this page will give you some interesting things to talk about.

- I. You have seen how the use of boats changed the ways of living in Phoenicia and Crete and Egypt. Has their use changed the ways of living in America? Why? If people had not learned to make boats, who would be living here now?
- II. You remember that Uncle John made "waterwalls" all around the islands and along the coasts on his map of the ancient world. Do we still have these waterwalls? Why?
- III. Would you like to be a great traveler? If you could go wherever you pleased, where would you travel first? Why would you like to go there?
- IV. If the Phoenicians had not had things to sell, would they have traveled about as much as they did?
- V. Which part of this story about the sea have you enjoyed most? Do you think you will enjoy reading more stories about the sea?
- VI. Oceans are so wide that many people never leave their own continent. If travel did not cost so much, would more people travel to other lands? Would that be a good thing to have happen? Give some good reasons why it is well for people to travel.

UNIT IV
THE STORY OF WRITING

Section I.	The Magic of the Newspaper	page 331
Section II.	Making a Language . . .	page 349
Section III.	Learning to Write . . .	page 357
Section IV.	Making Books . . .	page 383

I. THE MAGIC OF THE NEWSPAPER

Every day interesting things happen all over our country. Interesting things happen all over the world, too — in India and China and France and England and Brazil and Australia and faraway islands of the sea. Almost as soon as anything important happens, the newspapers tell us all about it. How can the newspapers gather the news and send it to us?

DR. THOMAS'S NEWSPAPER

Dr. Thomas was in the dining room when the rest of the family came in for breakfast. He had come downstairs early and had been reading the newspaper while he waited. He had already read the headlines and many of the news stories before the others came.

"Well, Daddy, what has happened?" asked Mrs. Thomas as she poured his coffee.

"Great things!" said the doctor, folding his paper. "Wonderful things are happening all the time. But the most wonderful of all is my newspaper. Every morning I find it on my doorstep. I bring it in and read it. In half an hour I know most of the important things that have happened all over the world."

"Say, that's great!" said Ted. "I never thought about it before. It's almost like magic to get news so fast. Think of knowing now what took place in Chicago and New York last night!"

"Chicago and New York!" exclaimed Dr. Thomas. "Why, they are right at our doorstep when it comes to getting news! Since I tied my necktie half an hour ago, I have had news from all over the world."

"Whew!" said Ethel. "You are quite a traveler, Daddy. What did you find out?"

"Well," said Dr. Thomas, "I found that there was a terrific storm off the coast of Brazil yesterday, and a big ship was lost. Last night a fire started on a large boat in the New York harbor, but it was put out before much damage was done. The Yellow River in China is rising again. People are afraid there will be another flood."

"How in the world do they get news so quickly?" Ted asked. "Brazil and China are a long way from here."

"Don't forget," his father said, "that hundreds and hundreds of people worked all day yesterday and all last night to get out this paper. Some of them, called *reporters*, gathered the news. I saw several reporters at the fire yesterday. Some wrote the stories. Some took pictures. They took or sent

their stories and pictures back to the newspaper office. Hundreds of workers worked at machines, too. Many kinds of machines are needed to help get out a newspaper."

"Yes," said Ted, "I know that there are machines to make the type letters and set the type, and printing presses to print the paper."

"And telegraph instruments to carry the news stories," added Ethel.

"And telephones and cables," said Mrs. Thomas.

"And typewriters," said Ted.

"And cameras," added Dr. Thomas.

"And machines to make the paper it is printed on," added Mrs. Thomas.

"And trains and trucks that deliver the papers to the news dealers," said Ethel.

"Yes," said Dr. Thomas, "it is nothing less than magic! Just think of the wonderful helps we have today in carrying the news — the machinery, the carriers, the reporters, and the special writers."

Where News Comes From. Look over the evening paper and notice all the different places from which the news has come. Often the headline tells the name of the place. Often the name is given at the very beginning of the first paragraph of the article. Make a list of all the different place names you find.

Bring your lists to school and compare them. Count the number of places from which your papers told news. How many were in America? How many were in Europe? In Asia? In Africa? See whether you can find the places on a map of the world.

Kinds of News. I. Ask your mother to tell you the kinds of news that she likes best to read. Ask your father to tell you the kinds of news that he likes best. Think over each kind of news that your mother or your father names. Is it the kind of news which your parents read because it is useful to them? Or is it the kind which they read because it tells interesting facts, or general information, about other people and other places?

Make a list of all the kinds of news which your parents name. First, divide your paper into two columns. At the top of the first column write "Useful News." At the top of the second column write "General Information." Then write the name of each kind of news in the column where it belongs. You might start your list in this way:

Useful News

Weather reports
Market prices
Recipes
Garden suggestions

General Information

News of other countries
Book reviews
News about our Government
Sports news

II. What do *you* like to read in the daily newspaper? Is there any part of your newspaper written just for boys and girls? Do you think there should be? Make a list of the things you would like to have printed in the daily newspaper.

Parts of a Newspaper. I. Some newspapers are divided into special parts. Each part tells all the facts about one kind of news. Sometimes each part takes a page or a part of a page. Sometimes it takes a whole section. Is the newspaper which you read divided into parts? Are the parts on different pages or in different sections? What kind of news is there in each part?

II. Why do newspapers have headlines? How do headlines help the reader?

MAKING A NEWSPAPER

Every morning, in most of the towns of this country, boys or men hurry from house to house and leave newspapers at the doors. A little later someone from each house goes to the door to get the paper.

Everyone wants to know the news. What has happened in the city? What new things have been discovered? What are people in other countries doing? How much loss has the fire caused? What kind of weather is to be expected? What sales are being held? When is the circus coming to town? What moving pictures are being shown?

Today the newspaper is an important part of our daily life. Have you ever wondered how newspapers are made? The story and pictures on the following pages will give you some idea of the work of making a newspaper.

Gathering the news is a very important part of the work of a newspaper. Big papers get wireless reports every night from all over Europe. These papers also have special writers who are sent to foreign countries. These writers usually send their stories to the paper by telegraph, radio, cable, or telephone.

To get city news, reporters are sent to all parts of the city. They go to hospitals, to police courts, to meetings, and to plays, anywhere there is news. A reporter often does not take time to write his story. He telephones it into the office. The man in the picture opposite is taking down a news story on the typewriter. He has the telephone receiver on his head so that he can use both hands for writing the story on the typewriter.

Stories sent in by the news gatherers are next given to "re-write" men, who check and cut them. Then they are given to "make-up" men, who decide on which page each story will go, according to its importance.

In charge of the newspaper is the editor in chief. He has many helpers — special editors in charge of each of the sections of a big paper.

Credit note: The photographs by Margaret Bourke-White on pages 337, 340, 343, and the lower half of page 346 are reproduced through the courtesy of the magazine *Fortune*. The photograph on the upper half of page 346 is from Times Wide World.





Times Wide World

THE CITY ROOM OF A NEWSPAPER

News stories are prepared for printing in the "city room." The men in the picture above are writing headlines. In another part of this room you might see the city editor giving directions to reporters and photographers.

After the news stories, special articles, editorials, and advertisements have been written and checked, they are sent to the composing room. Here linotype operators put them into type. You can see how these operators work by looking closely at the picture of a linotypist on the opposite page.

In front of each linotypist is a keyboard much like that of a typewriter. On the machine in front of him is his "copy," or the story which he is putting into type. As he reads his copy, he strikes the keys.



Ewing Galloway

A LINOTYPE OPERATOR

When the type for a whole page of the paper is set, copies of it are made in curved metal plates.

The picture on the next page shows a proof-reader. He is reading the proof of a story. If he finds any mistakes, they must be corrected before the metal plates are made. There is a curved metal plate for each page of the paper. The picture on the page opposite the proofreader shows you these plates on the press.





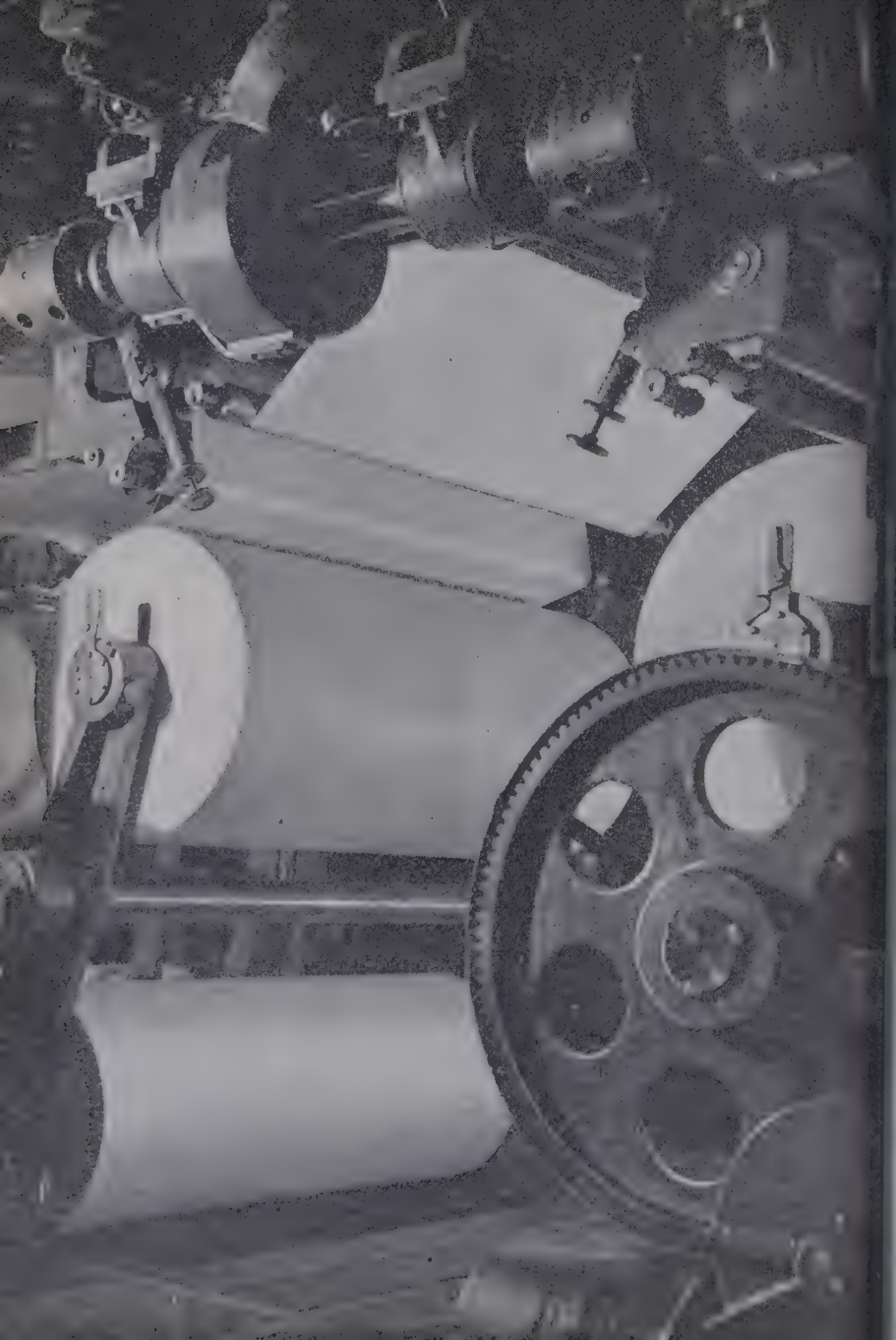
One of the things which you enjoy most in the newspapers is the pictures. There are pictures of people and pictures of places. There are pictures of ships, and trains, and buildings. There are funny pictures, too. Often there are colored pictures, which you like best of all.

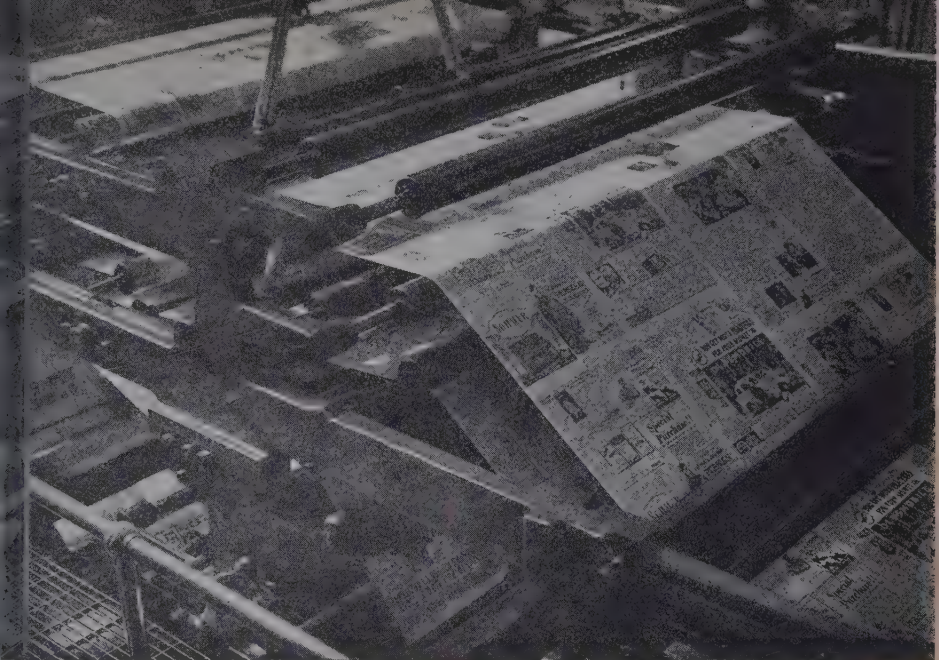
It takes a great deal of work to make the pictures you see in the newspapers. Look at the picture on the opposite page. It shows one newspaper worker getting the pictures ready for a picture section.

When you turn the page, you will see a picture of a huge printing press. It shows the great *reels* of paper that are being fed into the press. Each reel contains about five miles of paper. The width of this paper is from ten to twelve feet. The paper is drawn over rollers which keep it stretched. Then it passes over the curved metal plates of type. These plates which have already been inked do the printing.

Often as many as twenty presses are working at one time in a big newspaper office. Each of these presses has its own set of curved metal plates so that twenty copies of the paper may be printed at the same time. Each press is about twenty feet high and about forty feet long. What a noise they make all working at once! They work fast too. It takes about a second to print twenty newspapers.





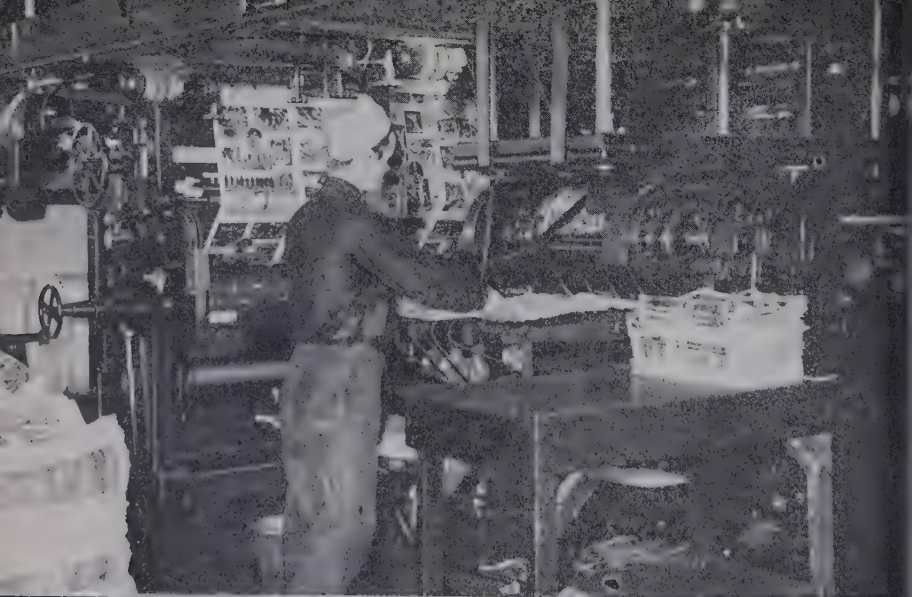


Ewing Galloway

A NEWSPAPER PRESS

A big newspaper press, like the one shown above, not only prints the paper but folds it as well. It is very different from the first presses used.

The boy in the top picture on the next page is taking the folded papers from the press. These papers will be sent to newsstands or given to newsboys to sell. The man in the lower picture on the next page is preparing papers to send out of town. Wrappers with names and addresses are ready so that when the papers are off the press, no time is lost in getting them to the readers.



How a Newspaper Is Made. Plan to have your class, or a committee from your class, visit a newspaper office in your city or county. Before you go, make a list of questions to ask. You will want to have these questions among yours :

1. How many kinds of workers help to get out the newspaper?
2. What does each kind of worker do?
3. How many machines are used?
4. What does each machine do?
5. In what ways is the news from other places brought to the office?
6. How are the papers distributed each day?
7. How much paper is used each day?
8. How can a newspaper be sold cheaply?

List all the questions you want to know about.

After your visit you will want to discuss the answers to questions. Plan a special time for your discussion.

Machines in the Newspaper Office. As you can see from the pictures in your book, people who make newspapers use many interesting machines. Choose the machine which you think you would like to run, and learn all you can about that machine. Make a list of questions to remind you of the things you wish to find out. Read about your machine in an encyclopedia or some other book. You will probably find what you want under the topic *Newspapers*. The pictures will answer some of your questions. Perhaps you know someone who can explain to you how the machine is used. Tell your classmates the interesting things you find out.

How News Is Gathered. Invite a reporter, or some other newspaper worker, to visit the class and tell you how his paper gathers news.

Reading More about Newspapers. The book *How the World Grows Smaller*, by Daniel J. and Dorothea Beeby, tells some interesting facts about newspapers. Find which pages to read by looking in the Index for the topic *Newspapers*.

Newspapers in Other Countries and in Other Times.

I. Have you ever seen a newspaper printed in the French or Italian language? See whether you can find and bring to class some newspapers printed in foreign languages. Can you read these newspapers? Do the letter signs that make the words mean anything to you? Why not?

II. Before newspapers were printed, how was the news told? See whether you can find out. Then tell your class.

II. MAKING A LANGUAGE

The newspaper has to use a language to tell news. You must be able to read a language in order to get the news. Have you ever wondered who first invented words? How did we get the thousands of words we now use? How did the people of the world get the many different languages they use?

INVENTING WORDS

Have you ever tried to talk to someone who spoke a different language from yours? If you have, you know how hard it was to make him understand what you wished to say. What did you do? Perhaps you waved your hands, nodded, pointed, and beckoned. You used signs, or *gestures*, as we call them.

Suppose that all the people in the world had as hard a time to make themselves understood as you did! We should not be able to enjoy the things people have to say — their jokes, their good stories, or the news they have to tell. We should not be able to learn from one another. Everyone would have to live very much by himself, work alone, think alone, and plan alone.

There was a time, thousands and thousands of years ago, when there were no words — no languages. How did the early people understand one another?

At first, people probably made others understand what they wanted and how they felt by *making sounds*. They cried out when they were in pain. They screamed when they were frightened. They laughed when they were happy. Such sounds had meanings. They became a kind of language. Everyone understood what the sounds meant.

Can you imagine what a conversation was like in those days?

“Ugh! Ugh!” one person might say.

“Wow! Wow!” would be the answer perhaps.

People probably used signs, too, to make themselves understood. They made motions with their bodies or with parts of their bodies. These motions came to mean certain things. The people pointed with their hands to show certain things or special directions. They shook their fists or stamped their feet to show that they were angry. They danced around to show that they were happy. Talking with signs or motions is called *talking with gestures*.

Even today we often talk with both sounds and gestures. We laugh and cry. We beckon and point. We nod and shake our heads. Our faces

show whether we are pleased or worried or afraid or sad or gay.

Probably people fought more in the early days than they do now, because they could not understand one another. They fought each other instead of talking things over.

After a while, people saw that they needed better ways of exchanging ideas than just by sounds and signs. There were very many things they wanted to say to one another. Sometimes they wanted to ask about food. Sometimes they wanted to boast about how strong they were or about an adventure they had had. Sometimes they wanted to tell one another the best way to do things. Often they needed to warn someone of danger. They wanted to talk; so they invented a way to do it.

Probably the first words men made up were the names of things about them. It must have been great fun to make a language. When people first started giving names, they did not have to remember the sounds which other people used. All they had to do was to think of some sound they liked and say it. They could look at the sky and make any sound that they wanted to make. If other people liked the sound, they used it, too. By and by, more people began to use that sound when they talked

about the sky. Then that sound came to be the name of the sky.

You do almost the same thing when you name your new pet dog. At first, he has no name. You may name him anything you want to. You think of a name that seems to fit him. Perhaps you choose "Wags" because he wags his tail all the time. Perhaps you choose "Spot" because he has a big black spot over one eye. After he has been called by this new name a few times, it seems to belong to him. It becomes his name.

Little by little, people and animals and objects came to have names. But actions had to have names, too. Walking, running, jumping — all needed names. Kinds of weather had to be named. Colors had to be named. Directions, such as east and west, up and down, over and under — all had to have names. Then ideas, such as anger, happiness, and fear, had to be named.

The number of words grew larger and larger. The more civilized the people became, the more words they needed. They saw more things, and they did more things. Everything they saw and did had to be named. After a while, there were thousands of words. In time, there were words enough so that people could say anything they wanted to say.

But you must not think that people were able to use words all at once. At first, people must have had only two or three words; then, eight or ten words; and so on, until finally they had hundreds of words. It took them thousands of years to learn to make a language.

What a change there must have been in the way men lived after they had learned to talk! They could do more things together. They could work together, play together, and plan together. They could help one another to get better food. They could warn one another of danger and help protect one another. As soon as they could talk, they could learn from one another, too. How much more fun they had! How much safer they were! How much better work they could do!

Talking by Gestures. I. Choose one of these sentences and pretend that you feel the way the sentence says:

- | | |
|------------------------------------|------------------------|
| 1. You are in pain. | 4. You are afraid. |
| 2. You are angry. | 5. You are sad. |
| 3. You are pleased. | 6. You are in a hurry. |
| 7. You do not like another person. | |

Make as many gestures as you can to show your feeling, but do not use a single word. See whether your gestures can make your classmates understand how you feel.

II. Think of some more short sentences for which you can make gestures. Make a list of the sentences and put the list on the blackboard. Choose one sentence, make the gesture, and then let the others guess which sentence you chose. You may think of such sentences as these :

- | | |
|---------------|----------------------|
| 1. Come here. | 3. I do not want to. |
| 2. Go away. | 4. I am hungry. |

What other sentences can you add?

Stories in Pantomime. Have you ever seen a clown tell a story by actions and gestures? We call that *pantomime*. Think of a short story that you can act by pantomime. Get one or two of your classmates to help. Act the story without using any words. Use only actions, gestures, and expressions of your face.

Do you think you could tell many stories that way? Why?

MANY WORDS AND MANY LANGUAGES

Not all people could talk together even after thousands of words had been invented. Not all people can talk together today. That is because all people do not use the same language.

From the very earliest times people from different parts of the world have been unable to talk together. That is because they did not all choose the same names for the things about them. In English we use the name *dog*. The Germans call a dog *der hund*. The French say he is *le chien*.

In the early days of wordmaking, the people of Egypt gave names to the things about them. The people who lived in Babylonia did the same thing, but they did not choose the same names. The people of Crete, the people of Phoenicia, those of Greece, those of Rome, those of China — all made words, but not the same words. The Egyptians could talk together and understand one another. The Babylonians, too, could talk together and understand one another. But the Egyptians could not understand the Babylonians, and the Babylonians could not understand the Egyptians. The people in any one country could not understand the people in any other country because each country spoke a different language. That was one reason many countries became enemies and had wars.

Even today in America, we have a problem about language. There are many people here who have come from other countries. Some of these people have not yet learned to speak English. For this reason, we in America sometimes have trouble in understanding other people living near us. This is especially true in large cities, such as New York, San Francisco, Seattle, Boston, and Chicago. How much better friends people would be if they could understand one another better!

Inventing Words. I. Have you ever heard a small child use words that he had invented? Tell what some of these words were, and what they stood for.

II. What words do you think must have been invented first? Probably they were the names of the most common things. Make a list of twenty words that you think might have been invented first. Do you think there are words for these same things in every language?

III. Have you seen anything lately for which you did not know the name? What was it? How did you find out the name?

Suppose you had been alone on a desert island when you saw the strange thing, and could not find out the name? What would you have called it?

IV. Have we all the words we need in the English language? Why might we need new ones? See whether you can find out some of the new words that have been added to our language in the last few years.

Languages of Other Countries. I. If you went to a strange country, could you make yourself understood? Why?

II. Do you think that different countries might agree better if they spoke one language? Why?

III. LEARNING TO WRITE

Learning to write was one of the most important things men have ever done. Probably it was one of the hardest things they have ever done. Why did people need to write words? How was writing invented? How did we get our alphabet?

REMINDERS AND RECORDS

Do you ever need help in remembering things you are supposed to do? Do you ever forget things that once you knew quite well? Do you ever try to tell a story and find that you do not know what comes next? Do you ever go to deliver a message and find that you have forgotten the most important part?

Of course you do — everybody does. We all need memory helps, or *reminders*, because our memories cannot do all the work we should like them to do.

There are many kinds of reminders. A string around your finger may be a reminder to you to return your library book. You turn your ring backwards on your finger to remind you to tell your mother the funny story you heard. Clocks remind you of the time. Lights at the corner remind you

when to cross the street. Camera pictures remind you of your friends or of interesting times you have had. You may keep a diary to help you remember what you have done each day in the year, or what you did during a vacation trip.

There was a time when people did not have all these reminders. They did not know how to write. They could not make written records to remind themselves of things that had happened. All they had were memories, and those memories probably did not work much better than our memories do.

The people of early times needed some way of keeping track of things. They wanted to remember how old their children were. They wanted to remember how much grain they had stored away. They wanted to remember how long it had been since they had moved to find new grass. So they invented memory helps.

Some of the early peoples used knotted cords as reminders. They began with a long, main string. For each thing they wanted to remember, they tied a short string to the main string. The short strings were of different lengths and of different colors. Each length of string meant certain facts. Each color meant certain facts. In each short string they tied different kinds of knots. Each kind of knot



meant certain facts. Some of these knotted strings told so many facts that they were almost like books.

Imagine that the old man in the picture on this page is reading like this :

This string reminds me of the time when our tribe nearly died from starvation. That happened in the year of the great storm. This knot tells me that twenty-five of our men went to the mountains to find meat to keep our families from starving. I see by this knot that only three of the men returned. They brought with them a mountain goat. I was one of those men who returned, and I was the one who had killed the goat.

This string tells me of the time that my boat was attacked by sharks. I was all alone and the shark upset my boat. I escaped only because I could swim well.

Sometimes people used a notched stick instead of a knotted cord. The notches were cut in different shapes. One kind of notch told how many babies had been born in the tribe. Another kind told how many people had died. Still another kind told how many moons the tribe had been living in a certain place.

Sometimes people used shells or colored beads to tell a story. The storyteller usually wove them into a pattern or a picture. Often the North American Indians made belts of shells or beads, called *wampum belts*. These belts told stories which were important to the owners.

But these reminders were not very good. No one could read them but the one who had made them. Other people did not know what the notches or knots or colors or shapes meant. If the one who made the record died, or forgot what each thing meant, the record was lost.

How did the primitive people learn about their own tribes? Fathers and mothers told their children the history of the family and the tribe. They told stories of the hardships and the victories of their ancestors. They told stories about their enemies, about their inventions, and about their travels. Some of the leaders of the tribes told stories to the

whole group. They became great storytellers. Everyone listened to these stories — the old people, who remembered some of the things that had happened; the young people, who had heard the stories many times; and the children, who listened for the first time.

When the children grew up, they told these same stories to their children. Then their children grew up and told the same stories to their children. If a story was never told, it was lost forever. There was no way of getting it back, because there was no record of it except in the memory of the people.

Perhaps you have read in stories about the messengers of early times, whose duty it was to carry word from one person to another. Did you ever stop to think how hard this must have been? How did the messengers remember what they were to say?

Perhaps a messenger was called before the king. The king told him where he was to go and what he was to say. Then he was sent away. He was not given a chance to repeat the words to see whether he had them right. The king did not say them twice for him to hear. All the messenger could do was to listen carefully. Then he would say the words over and over to himself until he knew them by heart. He would say them again and again as he traveled

along. He tried to remember each word. He tried not to change one sentence. If he forgot the message, it was lost. Then the king would punish him. Probably the messengers, more than any other persons in the world, wished for good reminders.

Reminders Today. I. Make a list of the reminders you use to help you remember things which you want to do, or buy, or tell about. Make another list of the things that you have to remind you of the important happenings that have taken place in the past. Make a third list of the reminders that call your attention to things to notice as you go about during the day or evening. Now check over your three lists. Place a star before each reminder that calls for the use of writing.

II. Write a short paragraph telling in what ways your reminders are better than those used by primitive people.

Carrying Messages. I. We have many kinds of messengers today. What kinds can you think of? Make a list. Are the messengers today as important as they were before the days of writing? Why?

II. Make some pictures that show messengers in primitive times receiving or delivering their messages.

III. Make some pictures that show messengers of today receiving or delivering their messages.

Records. I. Perhaps you would like to try to make a record by using knotted strings or notched sticks. Make a record of the important things that happen in your class. You will soon see how hard it must have been to keep good records with strings and sticks.

II. Make a picture that shows a storyteller of ancient times teaching his people the history of the tribe or the family.

III. Make a list of the ways of learning about the history of your country that you have today.

HOW PICTURES BECAME SIGNS

A long while ago people began to tell stories or happenings by drawing *pictures*. They drew pictures when they wanted to keep records of things that had happened. They drew pictures when they wanted to send messages. The person receiving the message could study out the meaning of the picture, but he could not read *exactly* what the sender of the message wanted to tell him. So the pictures could not be read as we read writing today.

People sent messages with pictures for many years before they made the pictures into writing. At first, each person drew a picture in his own way. One man's picture of a forest fire or of a mountain would not look exactly like another man's picture of a forest fire or of the same mountain. That was one reason why picture messages were hard to understand. Later on, all the people made a picture of the sun, or of a river, or of a tree in exactly the same way. Then people could understand what messages the pictures

carried. When the pictures were always made in the same way and always read in the same way, they became *picture writing*. Picture writing was the first real writing.

In the beginning of picture writing, people tried to make the pictures look like the objects they stood for. That is, to write *house*, they drew a crude picture of a house. But it took a long time to draw a picture. This way of writing was too slow.

Then people began to make the pictures more rapidly. As they did this, they left off parts of the picture. They drew only the roof of a house, instead of the whole house. This kind of writing could be done much faster. In this way the pictures that people had been using for writing turned into signs. All the people in one country made these pictures in the same way. They all read them in the same way, too. The signs were real writing — picture writing.

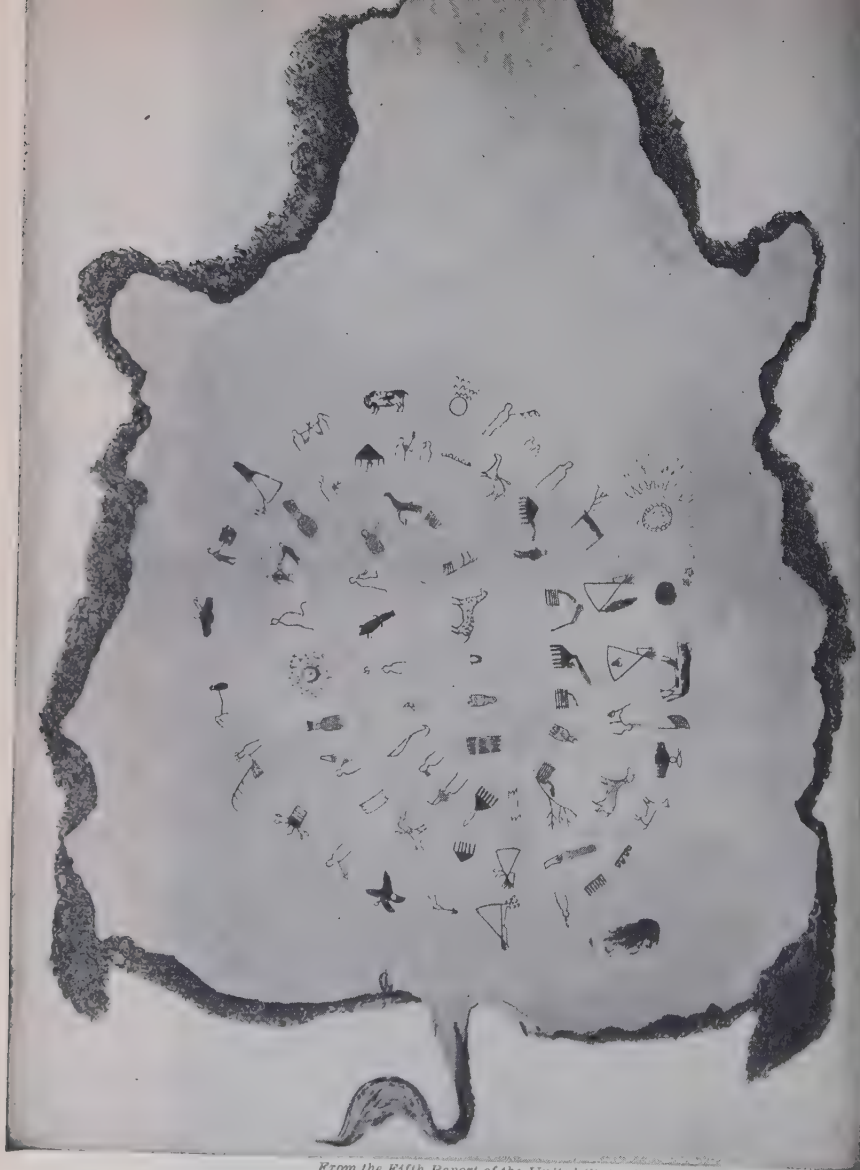
Signs such as people made in picture writing are called *symbols*. A symbol is a sign that stands for something. Even today we use symbols. You know the symbol +. It means "add," or "put together." You know the symbol \$. It stands for "dollars." The most important symbols used today are the letters of the alphabet and the numbers.



Painted by Charles A. Knight and the direction of Henry Fairfield Osborn. Copyright by the American Museum of Natural History

CAVE PAINTINGS

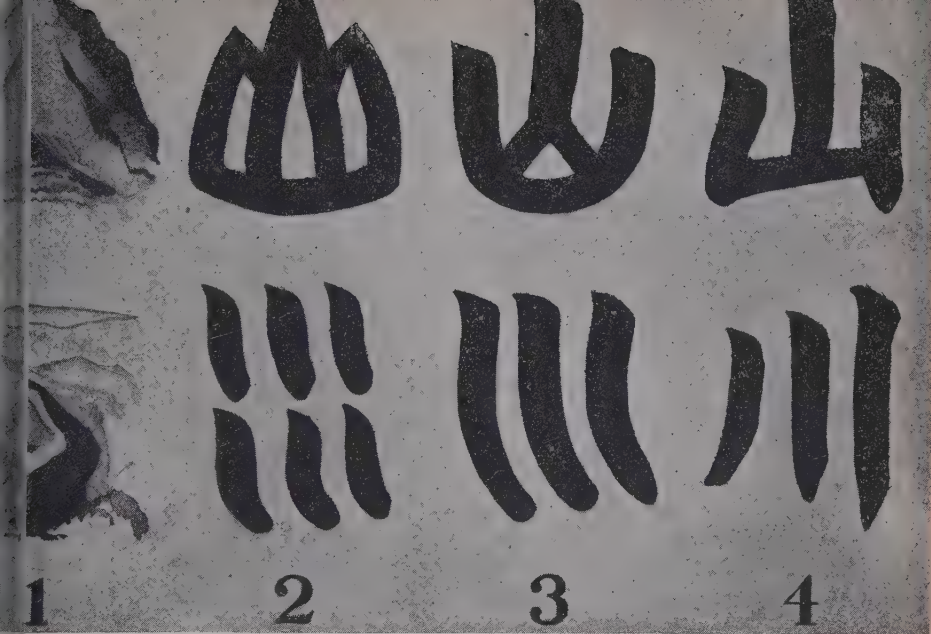
In this picture you see primitive men painting on the wall of their cave. The paintings tell the story of a hunt. Primitive men used pictures, instead of writing, to tell their stories.



From the Fifth Report of the United States Bureau of Ethnology

A PICTURE STORY

The picture writing on this buffalo skin tells the story of the adventures of an Indian tribe.



TWO CHINESE SYMBOLS

The pictures above show the story of two old Chinese symbols. Each symbol in the upper set of pictures means "mountain." In primitive days, when picture writing began, the people drew a picture of a mountain, like picture number 1 in the top row. That took too much time. So they left out a few lines and made the symbols you see in number 2 in the top row. Later they left off a few more lines and made symbol number 3, then number 4, and that is the way it is written in China today. Now study the symbol "river."

Three groups of people began very early to use picture writing. These were the Egyptians, the Babylonians, and the Chinese. We do not know which of these groups of people learned to write first. We know only that all three groups took the same steps in learning to write — they began with pictures and then changed the pictures to symbols. Did the pictures on the page before this help you to understand how pictures changed to symbols?

Writing and Reading Picture Messages. I. Can you write a message that uses only pictures? . Try it, and you will see that it is not easy to say all the things you may wish to say. What are some of the things you were not able to tell in your picture message?

II. Can you get the meaning of a message in which only pictures have been used? You may find that it is quite as hard to read such a message as it is to write one. Place on the wall all the messages which your class have written. Take your paper and pencil and write down the meaning you get from each message. Then ask the writer of each message to tell you whether you have read the meaning correctly.

III. How long did it take you to write your message using only pictures? Perhaps the length of time it took you will help you to understand why the ancient people changed their pictures into picture signs or symbols. What is one great difference between a picture and a symbol?

SIGNS FOR IDEAS AND SIGNS FOR SOUNDS

These first writers — the Egyptians, the Babylonians, and the Chinese — found it easier to send messages when they changed from picture writing to symbols. Probably they did not need anything better than picture signs as long as they were shepherds and hunters. They did not need to write very often. When they did write, they told about *things* — weapons, animals, food, or trips. It was easy for a hunter to send a message saying that he had killed a bear. All he had to do was to draw picture symbols that showed himself, a spear, and a dead bear. The picture told the whole message.

Then the ways of living began to change. Many of the hunters and shepherds became farmers. You have already read how the Egyptian farmers began to live in villages. Then they started new kinds of work. They built houses and temples. They made many different things to use. They began to own property, to worship gods, and to plan and work in groups. This same kind of change in the ways of living came to the early people of Babylonia and China, too.

As the people changed their ways of living, they had many more things to talk and write about.

They began to talk about ideas, too. Then they found that they could not yet write everything they wanted to say, for they could not make pictures of ideas.

Try it yourself and see how hard it is to write an idea with a picture. Suppose you had to write the idea *school*. How could you do it? You might make a picture of a building, but that might mean just "house" or "building." You might make a picture of children with books, but that might mean "studying" or "reading." You might make a picture of books, but that might mean "library." You might make a picture showing a teacher and the pupils with books, but that might mean "teacher" or "teaching." Can you think of any picture that would mean "school" and nothing else?

How could anyone make a picture that meant "thirst" or "busy" or "today"?

So you see it was very difficult for the people to get pictures or picture symbols for their ideas. They could only talk about them. But just talking about ideas did not satisfy the people. They wanted to write about the ideas, too.

In time, some bright person thought of making a symbol of an idea by drawing a picture of something that suggested the idea. For example, he wanted to

write the idea "busy." He said to himself, "Let me see — what is there that is always busy? A bee! I will draw a bee." So he drew a picture of a bee and called it "busy." In that way he had a symbol for his idea and could write it always that way.

Other people liked this way of writing. They made other symbols. After a while, people were using a picture of a ball to mean "round," and a picture of an eye to mean "seeing." They were using a picture of a calf running toward a pail of water to mean "thirst," and a picture showing both the moon and the sun to mean "light." These new symbols were called *idea signs*.

We still use idea signs. Have you ever seen a bottle of medicine with a label bearing a small picture of a skull and crossbones on it? You may have seen a bottle like that at a drugstore. What does the little picture mean? The picture carries a message. It is a sign that means "poison." The sign is placed on the bottle so that anyone, whether he can read or not, will know that the bottle contains poison. Such a sign is very much like the idea signs that the ancient people used for writing records and messages.

But idea signs did not solve the writing problems of the ancient people. When they saw a picture of a

bee, they were not sure whether it meant "a bee" or whether it meant "busy." Then, if a person could not draw very well, his picture of a bee might look like a fly or some other insect.

The next change came when someone else had a bright idea. "We all know the spoken words," he said. "Why not make a sign for each different sound?" Other people thought that this was a good idea. So they made a sign for every sound.

Sometimes a *sound symbol* stood for a whole word. If a word had more than one syllable, they used more than one sound symbol to write the word. With the help of these new sound symbols, the ancient people were able to write words that stood for names and words that stood for ideas. They were able to write the names of people. They could write anything they wanted to tell, because they could write exact words. Then the people who read the writing knew exactly what the writer had meant to tell them.

Sound symbols made writing and reading easier and clearer. The people did not need their picture signs and idea signs any more. Sound signs could be used for anything the people wanted to write. But the people were fond of their old picture and idea symbols. They did not want to give them up. So they used the new sound signs and the old signs.

too. Then they had even more symbols to remember, for they had three different kinds. That is why many of the Egyptians never tried to read and write. That is why they kept on paying scribes to do their reading and writing for them. That is why, even today, many of the Chinese people cannot read and write their own language.

The Egyptians, the Babylonians, and the Chinese worked for hundreds of years on the problem of writing. At last, they found a way. They thought their way was good, but it was a hard way. If they had worked still longer, they might have found the best way and the easiest way to write. If they had not been satisfied too soon, they might have invented the alphabet. The alphabet is the easiest set of symbols to use in writing. It is the easiest set of symbols to read. Who invented the alphabet?

INVENTING THE ALPHABET

East of the Nile River, at the head of the Red Sea, is the Peninsula of Sinai. On this strip of land, thousands of years ago, the Egyptians found copper.

Now the Egyptians, as you have read, had built up a wonderful civilization. The Pharaoh and the nobles were very rich. They had learned to like beautiful things. They wished to live in comfort

and ease. Their clothing, their food, their houses, and their tools were probably the best that could be found anywhere in the world at that time.

The Egyptian craftsmen were among the best workers in the world, too. They liked good materials with which to work. They used great quantities of copper. They used it for making tools, ornaments, and weapons. They sold these things to the Egyptian people and to traders from other lands.

Many of the workmen in the mines at Sinai came from Seir, a country north of Sinai. The Egyptians hired great numbers of them. Many of the Seirites brought their families with them to live near the mines.

At first, the miners worked under the direction of the Egyptians. But as time went on, many of the men from Seir became foremen and directed the work of the other Seirites. The Egyptians depended upon them and trusted them.

The foremen of the Seirites were excellent workmen and could do every part of the work except one. They could not make their reports to the Pharaoh. Each time a ship arrived from Egypt, officers of the Pharaoh came to see how the workmen were getting along. They brought scribes with them, and these scribes always asked for reports.

But the foremen could not make these reports. They could not write their reports in Egyptian. They did not even know how to write in their own language. Nobody knew how to write in the language of the Seirites. What were they to do?

They solved their problem in a new way. They invented an alphabet. With this alphabet they learned to write their own language.

The Seirites drew symbols of twenty-one common objects — things which they saw about them in daily life. Each symbol was called by the name of the object it pictured. It was given the sound of the first sound in the name of the object.

The first symbol the Seirites made was the head of an ox. In their language an ox was called “alph.” Therefore, they named the symbol “alph,” also. It stood for a sound that is much like the one you would make if you sounded the letter *a* in our language. It is the first sound in the word *alph*.

The next symbol they made was a shed or a house. In their language a shed was called a “bet.” So, of course, the symbol was also called “bet” and was sounded like our *b*.

The Seirites found that they needed only twenty-one of these symbols in order to write any word in their language. All they had to do was to use as

many symbols as there were sounds in the word and to put the sounds in the right order.

We do the same thing today with the letters of our alphabet. Sometimes we need only one letter to make a whole word, as in the words *a* and *I*, or we need two letters, as in the words *be*, *at*, *in*, and many other words. But usually we need more than two letters. Think of the number of letters it takes to write such words as *Babylonian* or *civilization* or *Mediterranean*! Do you know any words that take even more letters?

Some of the symbols which the Seirites made were much like the signs which the Egyptians were using. For this reason, some people have thought that the Egyptians invented the alphabet. Probably the Egyptian scribes did help the Seirites in choosing their symbols. But they were not the people who invented the idea of an alphabet, and they did not use it in their own writing. They were so fond of their idea symbols that they would not give them up.

As we have said, the Seirite copper miners invented the alphabet. But we must not forget that the alphabet is only the last step, and the best step, in learning to write. It took thousands of years to work out a way of writing. Many different people had a part in working it out. The Seirites were

only finishing the work which the Egyptians, the Babylonians, and the Chinese had begun.

Inventing the Alphabet. Would you like to make a play out of the story of the invention of the alphabet? Perhaps your class could write a play which you could give before another class or in an assembly of the whole school. Here are some scenes which you might want to use :

SCENE I. Some Egyptian sailors arrive at the Court of the Pharaoh and report the discovery of copper on the Peninsula of Sinai. The Pharaoh commands them to return to the peninsula and open up mines.

SCENE II. The Egyptians at the copper mines are overseeing the work. They hire workmen from near-by Seir.

SCENE III. The Egyptians place Seirite leaders in charge of the mines and return to Egypt.

SCENE IV. The Egyptians arrive at the mines to inspect the work. They ask for reports to take to the Pharaoh. The Seirites cannot make the reports. They are threatened with punishment.

SCENE V. The Seirites try to find a way of making reports. An Egyptian scribe helps them. At last, they are successful.

SCENE VI. The Egyptians again arrive. The Seirite leader proudly presents the Egyptians with a report written in the new way — the alphabet way of writing.

THE ALPHABET GOES TRAVELING

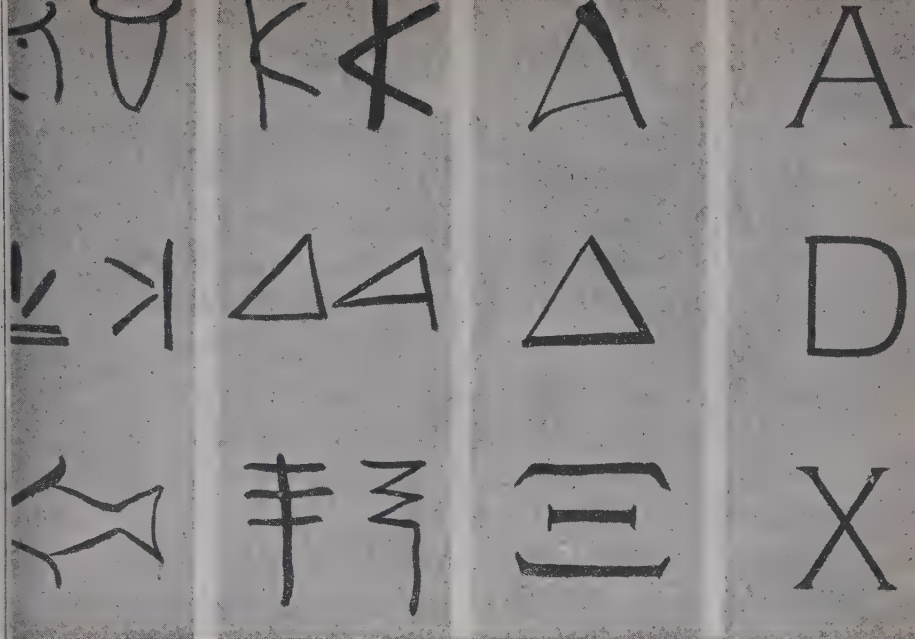
The alphabet was too good an invention to stay in one place and to be used by only one group of people. Other people wished to use the idea as soon as they heard about it. Travelers told other travelers about the alphabet. Before long it was traveling all over the world.

The Phoenicians were probably the first people to borrow this alphabet idea and to use it for writing their own language. They were sailors and traders. They needed a way of writing, so that they could keep records of what they bought and sold. They needed to write, so that they could send messages.

The Phoenicians were great travelers. They went from coast to coast and from island to island. As they traveled, they showed other people how to use the idea of the alphabet. They taught so many people how to write their language in this easy way that for many years people thought the Phoenicians were the ones who invented the alphabet.

The Hebrews, too, borrowed the alphabet from their Seirite neighbors. They used it to write the history of their race. These wonderful stories were afterwards gathered together in the Bible.

The Greeks learned to use the alphabet. The Romans used it. As time went on, all the people



THREE SOUND SYMBOLS

The first column at the left of the picture shows how the Seirites made three of their sound symbols. The second column shows changes made by the Phoenicians. The third column gives the Greek symbols and the fourth column gives the forms we use today.

At first the Seirites used the head of an ox to represent the whole ox. Then they made it stand for the first sound in their word for ox. The Seirite word for ox sounded somewhat like "alph." When the Greeks made the ox head it was upside down and so it has stayed.

What can you find out about D and X?

living along the Mediterranean Sea learned about it, and most of them were using it.

People in other lands had to change the letters of the alphabet to fit their own language. Sometimes a group of people found that they did not need all the sounds in the alphabet which they had borrowed. Then they dropped some of the letters. Others had to add new letters to stand for some sounds which they needed. Still others made one letter stand for more than one sound.

The Greeks added the vowel sounds, *a*, *e*, *i*, *o*, and *u*, to the alphabet. Before the Greeks began using the alphabet, words were written without these sounds. *David* would have been written "DVD." *Sound* would have been written "SND." *Letter* would have been written "LTTR."

So the alphabet traveled about in many countries and among many people. Everywhere it went, people were glad to see it. "It is just what we need," they would exclaim. "We must learn to write this new way — the alphabet way." Then they would make the changes in it which they needed to make in order to write their language.

But with all the changes in letters, people made no changes in the alphabet idea itself. The idea of having symbols stand for the sounds of a spoken

word is just the same today as it was when the Seirites first invented it. Thousands of words are still written with a few little signs that stand for sounds. The alphabet is still the best idea for writing that men have ever had.

When the Romans first learned to write the alphabet way, they were uncivilized shepherds. Later they became civilized. Their power spread through the whole civilized world. Their armies conquered the old countries in Egypt and Babylonia and Persia and Palestine. They conquered Greece. They conquered many other parts of Europe. Everywhere they went, they taught the people to use the alphabet, if those people had not already learned to use it. The Romans were the greatest teachers of alphabet writing. Today the alphabet is used by most of the people of the world.

Thinking about the Alphabet. I. It has often been said that the Phoenicians were the first people to have an alphabet. How did it happen that people thought the Phoenicians were the first to use it?

II. After the alphabet was invented, it traveled near and far. Why was it so popular? Why could it be used by people in different countries even when they spoke different languages?

III. As the alphabet traveled around from one country to another, it was changed by the people who used it.

What were some of the most important changes that were made in it? Did these changes do the alphabet any harm? Did they make it better? In what ways?

IV. The well-educated people of Egypt, China, and Babylonia ~~were~~ good writers long before the alphabet was invented. But even today many of the people in those countries have to hire scribes to do their reading and writing for them. Why is that so? Why do we not have to hire scribes to help us write our letters and read those we get?

V. Abraham Lincoln, who was one of our wisest presidents, once said that the invention of the alphabet was one of the greatest inventions ever made. Do you agree with him? Why? In what ways do you think it has helped civilization the most?

IV. MAKING BOOKS

Each year millions of newspapers and magazines and books are printed for people to read. They are sold to people all over the world. We have much to read because men have learned how to make cheap paper. They have learned how to print with machines. Have people always had paper to use? Have books always been printed, as they are now?

BOOKS AND RECORDS OF EARLY EGYPT

It took centuries for men to learn how to write. It took them even longer than that to find a good tool to write with and something to write on.

When men first began to write, they made their pictures and signs on anything they found about them. They probably marked on the sand, on smooth shells, on flat bones, or on anything else that was flat and smooth. Perhaps they marked on large leaves. But pictures on sand were rubbed out. Shells and bones were lost. Leaves dried up.

The oldest writing that has been found was carved on stone. That does not mean that men made their first marks or drew their first pictures on stone. It

means that the records made on stone were the only ones that were not destroyed.

But the savages were not the only ones to cut their records on stone. Many civilized people have also used stone for their records. Probably the Egyptians were among the first to do so. Egyptian picture writing may still be seen, carved on the sides of the cliffs and on the walls of temples and tombs. The Egyptians wanted all the important things that happened in their country to be written down for others to read. They wanted these records to last forever, too. So they wrote them on stone — the strongest writing material they could find. We call these records *inscriptions*.

A writer on stone could not use pen and ink. He had to use a hammer and a sharp tool, called a *chisel*. He had to take great pains to make every picture just right. Was it not to last forever?

Other people have written their records on stones, too. In many parts of the world inscriptions have been found carved in the solid rocks. Perhaps it was lucky that the early people used such a hard writing material. From the inscriptions we can find out many things about ancient times.

Not all of the early writing was done on stone. The Egyptians had another kind of writing material.

This was a kind of paper made from a plant that grew along the banks of the Nile. The plant was called *papyrus*. It had tall stems and fanlike leaves.

The papyrus was one of the most useful plants the Egyptians had. They bound its thick stems together to make boats. They wove its fiber, or threads, into cloth. They used the bark for sandals and for dishes. They made boxes from it, and toys and whistles for the children. They used some of the young plants for food. They squeezed out the juice to make a drink. There seemed to be no end to the uses they found for this wonderful plant.

To make a material to write upon, the Egyptians cut the stems of the papyrus plants into pieces about sixteen inches long. Inside the stem was the *pith*. The pith was taken out and cut into thin strips. Strips of pith were laid side by side in a layer. On top of the first layer of strips a second layer was placed, crosswise. The two layers of pith were then soaked in water. After that, they were pounded together until they would not fall apart.

The sheet was then pressed under a heavy weight to make it flat and even. Then it was dried in the sun. At first the sheet of papyrus was a light yellow. Later it turned to a darker shade of yellow, or to tan.

Of course, some pieces of papyrus were better than others. The sheets made from the best and straightest plants were the smoothest. They brought the highest prices. There was a big difference in the way they were prepared, too. When the strips were laid carefully and were well pressed, the sheets of papyrus were smoother.

In writing on papyrus, the Egyptian scribe used a pen. But this pen was not like the steel or gold pens which we use today. It was the stem of a hollow reed, or water grass, which was split and pointed.

The sheets of papyrus were from twelve to sixteen inches wide and about sixteen inches long. When the Egyptians wanted to make a book, they fastened together in one long strip as many of these sheets as they needed. Sometimes the strips were more than three hundred feet long. The writing ran in columns across this long strip of papyrus like pages side by side. One column was wide enough for about six or seven words.

Each end of the long strip of papyrus was fastened to a rod, or roller. These rods were long enough to stick out, like handles, beyond the papyrus. The papyrus strip was rolled up on one of the rods, as a curtain is rolled. The reader held the roll by the rods. As he read, he unwound the roll with one hand



Courtesy Metropolitan Museum of Art

EGYPTIAN SCRIBES

These Egyptian scribes with their pens stuck over their ears are all ready for work. Two of them have pen cases under their arms. Can you see the two round holes in their pen cases? The scribes make red and black ink in these holes. The small table holds a jar for water and two writing tablets.

and wound it up on the other rod with the other hand. When he had finished reading the roll, he placed it on a shelf.

A book made of papyrus rolled up on rods was called a *scroll*. Scrolls were among the first books made. It must have been very difficult to write an Egyptian book, or scroll; but many of them were made. Some of these papyrus scrolls may still be seen in museums. They have to be kept in glass cases in the museums because they are very old.

They probably would fall to pieces if they were handled much.

Papyrus was sold to many people. It was sold to the traders who carried it to other countries. It was sold to the business men, to the priests, and to the officers of the Pharaoh. But, most of all, it was sold to the Egyptian scribes. The scribes, as you know, were men who were especially trained in writing. They wrote letters and books, signed papers, and kept accounts. They had to use much papyrus for this work.

Writings on Stone. I. Try to find pictures which will show some of the inscriptions which the Egyptians carved on the walls of their pyramids thousands of years ago. Study the pictures to see the kind of writing they used on stone. The Egyptians did not use the same kind of writing when they wrote on stone as they did when they wrote on papyrus. Why did they have to have two kinds of writing?

II. What kinds of tools did the Egyptians use to write their records on stone?

III. The Egyptian inscriptions were records. They told about the things which the Pharaohs did while they were living. Of what use are these inscriptions to us today? Talk over this question in class.

Papyrus. I. What are some of the ways in which the Egyptians used the papyrus plant? On your paper make a list of as many of the ways as you can.

II. Make a picture which will show how you think the papyrus makers looked while at their work. How would you have the men dressed? What would they be doing? What tools might they be using?

III. How did the Egyptians make their papyrus scrolls? Try to remember each step taken in the making of a scroll. Then be ready to tell the story to the class.

THE CLAY BOOKS OF THE BABYLONIANS

You remember that the Babylonians were also one of the first groups of people to learn how to write. Like the Egyptians, they built up a great civilization. Like the Egyptians, they made records of every important thing that happened. They wished their children and their grandchildren and everyone else to read of their great deeds.

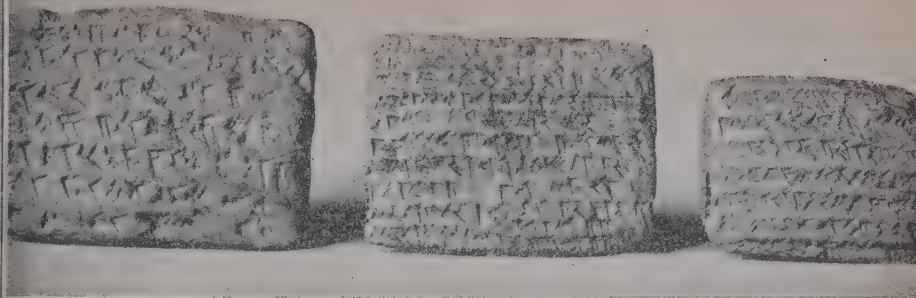
The Babylonians wanted a way of keeping their records so that they would last forever. They lived in a flat country where the land stretched for miles and miles in sand and clay. They could not carve their inscriptions on stone because there were no mountains or hills, and very few stones or rocks. The papyrus plant did not grow in Babylonia. What could they use for their records?

There was plenty of clay in the valley where the Babylonians lived. They had learned to use clay for almost everything. They used it for making

houses and temples, furniture, dishes, jars for storing food, and even their grain measures. What was more natural than to use this material for making books?

So the scribes of Babylonia used tiles, or tablets, made of soft clay. They scratched inscriptions on the tablets. They wrote their history. They wrote stories and poems and messages to their gods. They wrote letters to one another and messages to people in far countries. They used queer little pictures, which were their sound signs, for writing records or messages. They scratched the pictures on the clay tablets with a pointed piece of metal or wood, called a *stylus*. They wrote very fast. They wrote very small. They wrote all over the soft clay tablets, from top to bottom.

When the scribes had finished their writing, they gave the tablets to the potters. Clay must be put into a furnace and baked. That was the only way to make it hard. So the potters put the tablets into a furnace. They took care that nothing touched the writing. They baked the clay tablets several hours, until they had become as hard as stone. Then the fire was taken out of the furnace, and the tablets were left to cool. When the tablets had cooled, they were ready to be sent back to their owners. Just think of baking books!



Courtesy Metropolitan Museum of Art

CLAY TABLETS OF THE BABYLONIANS

Imagine a library filled with these heavy, hard clay tablets! Not many years ago such a library was found. It was found buried in the earth where the city of Nineveh had once stood. Thirty thousand clay-tablet books were found in this buried library. These books can never be burned up. They are so hard that they do not break easily. Perhaps they will last longer than any other books in the world.

Making a Clay Book. I. Try making a book the way the Babylonians made their books. Use clay and make it into an oblong tablet. Then make the little wedge-shaped symbols with a nail or a sharp stick. You can see how the writing of the Babylonians looked if you find the word *cuneiform* in your dictionary. You may have to look for the topic *Writing* if you use the encyclopedia. After you have written on your tablet, you can bake it in the furnace. It should be placed in a can which has a cover.

II. Make a picture showing the potters at work baking their books in ovens shaped like beehives.

Using What Nature Gives. In olden times people had to use the things they found about them. They did not have trains, trucks, or buses for carrying materials from one part of the country to another. Explain to the class why the Babylonians did not use stone tablets or papyrus, as the Egyptians did. Explain also why the Egyptians did not make clay books, as the Babylonians did, and why they did not learn to make the kind of paper we have today.

THE CHINESE AS BOOKMAKERS

The Chinese were the first real papermakers. No one knows how long ago it was that the Chinese invented paper. It must have been at least two thousand years ago.

For hundreds of years the Chinese did not tell anyone how they made paper. They did not want anyone outside of China to make any of it. But, at last, the secret became known, and people in other parts of the world began to make paper.

The Chinese made their paper from rags. For a long time people thought that paper could not be made from anything else. Even today some of our paper is made from rags, but most of what we use is made from wood.

The Chinese were also the first people to make books by printing them. They learned to carve

pictures or symbols on blocks of wood. Then they put ink on the blocks of wood and pressed them against the sheet on which they wanted to print. Sometimes they used cloth to print on. Often they used paper.

The Chinese learned how to make many copies of the same thing. They pressed the inked blocks of wood again and again upon the sheets of paper or cloth. At first they printed playing cards. Later, they printed pictures, and then, at last, books.

Does the Chinese way of printing seem an easy way to make many copies of things? It *is* easy, now that we know how. But it was not easy to think *how* to do this the first time it was done.

At first, the Chinese carved a whole page of symbols on one block and printed the whole page at one time. When they were through printing that page, nothing more could be done with the block. A new block had to be carved for each page.

So the Chinese printers learned next to carve each symbol on a separate small block. These small blocks were put together to make a page. The small blocks could be used over and over, because each one was a single symbol and could be moved around to make different words. This kind of printing is called *printing with movable type*.

But this plan did not work very well either. The Chinese did not have just twenty-six symbols, or letters, as we do. They used separate symbols for each of the forty thousand words in their language. It was very hard to keep track of all of the little blocks when they were not in use. For this reason, printing with movable type was not very successful in China.

After the Chinese invented paper and printing, they made many books. They wrote down the wise sayings of their emperors and leaders. Many Chinese studied these books of sayings and became very wise. The invention of paper and printing helped the Chinese to build a great civilization.

But China did not want other people to know how to print. She kept this way of printing a secret, just as she had kept the secret of papermaking. China did not like to share with others the wonderful things she had discovered.

Making Paper. I. The Chinese were the first people to find out how to make paper. Write a paragraph explaining their way of making paper. To learn more about papermaking, look up *Paper* in the encyclopedia.

II. The Chinese kept their way of making paper a secret for many years. Why didn't China want other countries to know about her great invention?

III. Perhaps you would like to give a little play to show how the Chinese kept their invention a secret. Talk over your plans in class. Decide how many characters and how many scenes you will have. You may want to show these scenes:

SCENE I. Wing Foo and his workers are busy in the papermill. The emperor's visitors from another country come to the mill, but they are not allowed to see what the workers are making.

SCENE II. The emperor is in his library, looking at his books. The same visitors arrive at the palace, but the emperor does not let them see inside the room where his books are kept.

SCENE III. The visitors, who are very curious about the papermaking, meet Wing Foo along a lonely road. They try to make him tell the kind of work he does, but he refuses. One of his workers, however, gives away the secret. Wing Foo finds out that the secret has been told and hurries off to the emperor.

SCENE IV. The emperor listens to Wing Foo's story. He sends soldiers after the workers and the curious visitors. The workers are punished, and the visitors are not allowed to leave the country. They are forced to spend all the rest of their days in China.

Ways of Printing. I. The Chinese were the inventors of printing, too. Write a paragraph to explain how the Chinese invented printing.

II. Explain to the class why printing was a hard thing to invent but an easy thing to do after it had once been invented.

III. We print our large newspapers and books with movable type. What does that mean? The Chinese used movable type, too. They invented it. But they did not like movable type as well as the large blocks which printed a whole page at a time. Why?

FINDING A NEW WRITING MATERIAL

For many years, even after the Chinese had invented paper, papyrus was used for paper in other countries. The papyrus plant grew best along the banks of the Nile; so Egypt supplied papyrus for most of the other countries. Egypt made much money selling papyrus to other civilized countries. People were willing to pay well for papyrus, because it was the best writing material they could buy at that time.

But the Egyptians were not always fair about their papyrus trade. Sometimes they charged more than they should. Sometimes they would not sell to everyone who wished to buy. After a while, they lost their trade. How did it happen?

The Egyptian Pharaoh was proud of the number of books he had. He wanted to have the finest library in the world. He did all he could to get more and more books. Scribes were kept busy copying books all day long. Priests, too, made books. Traders brought books to Egypt from other countries.

The king of Pergamum, a city of Asia, was also proud of his library. He, too, wanted to have the largest and finest library in the world. He bought books from other countries. He sent to Egypt for a supply of papyrus. He ordered his scribes and his priests to copy the books and place them in his library.

The Egyptian Pharaoh did not like this. He decided to keep the king of Pergamum from making more books. So he ordered the papyrus makers not to sell him any more papyrus.

"Do not allow even one shipload of papyrus to be sent to Pergamum," was the order. "We shall see who can have the largest library in the world. If the bookmakers of Pergamum cannot get papyrus, they cannot make books."

Then the king of Pergamum called together his most skillful leatherworkers. "We cannot get papyrus," he said to the leatherworkers. "We must find something to use in the place of papyrus for making books. Take the hide of an animal and make a leather that is smooth and soft and even. Make leather on which we can write with ink. The leather must be clean and very, very thin. Make great sheets of leather that are smooth and thin. The sheets must be soft and even, too."

Then the leatherworkers went to work. They scraped and pounded and rolled and dried the hides. At last they went to the king.

“We have sheets of leather on which the scribes can write,” they said. “The leather is so thin that we can fold a whole sheet of it and put it into a nut-shell. It is smooth, too, and very even. It is clean and light yellow in color. On it the scribes can write rapidly, and their ink will not blot. We call the new leather *parchment*.”

From that time on, people no longer had to buy papyrus from Egypt. There was something else they could use. Was not parchment made in Pergamum? Was it not much cheaper than papyrus? Did it not last much longer and make much better-looking books?

For hundreds of years parchment was the chief material used for making books in Europe.

MAKING BOOKS IN THE MONASTERIES

The Egyptians, the Babylonians, the Greeks, and the Romans were all powerful peoples at different times. They all had good books. But one after the other of these peoples lost their power. When they lost their power they lost their love of books and learning, too.

So there was a long time — a very long time — when most of the people did not care much for books. Indeed, there were not many who even knew how to read or write. During those centuries most of the people were busy building castles and churches or fighting and protecting themselves from their enemies. They did not have time for books.

But there were a few people who still loved books. These people were the *monks*, or the men who served the church. The monks lived together in buildings called *monasteries*.

The monks did not spend their time fighting or trading, as other people did. They had a great deal of learning and spent their days reading and studying. They needed more books for their studies. How were they to get books?

Very few new books were written during those centuries. The only way the monks could get books was by copying old ones. They had to copy by hand the books that had been written years before by the Hebrews, the Greeks, and the Romans. Many of the monks spent their whole time at this work. They copied the books for the libraries of the monasteries. They took great care to make these books beautiful.

Most of their books were written on parchment. Every letter was carefully drawn. Every line was

carefully placed on the page. Every space was measured. The words must be correctly spelled. The sentences must be correctly copied. The monks became the best bookmakers the world had ever known.

The monks painted pictures on many of the pages they copied. The pictures were done in beautiful colors — gold, bright red, lovely blues. The monks could make many kinds of pictures. Sometimes they made flowers. Sometimes they painted dragons and goblins along the edges. Sometimes they painted birds and trees and butterflies. Sometimes they painted people. These pictures made the pages of the books very beautiful.

Often the letters were done in colors. The first letter on each page was usually made bigger than the others. Sometimes it was colored in gold and decorated with birds and flowers.

Usually several monks worked together in a large writing room. They had people to help them. Often these helpers were the children of the peasants who lived near the monasteries. The helpers often ruled lines on the parchment, mixed the ink and the colors for the pictures, and waited upon the monks.

The monks were proud of their large libraries. They were proud of their books, too. They were

willing to work long hours to make more of the beautiful books. Sometimes two monks would work together on the same book. A good writer would do the writing. Then another monk would make the pictures. Sometimes one monk would do both parts of the work.

No other books have ever been made that were more beautiful than those which the old monks made. But nobody knows how hard it was to make those books. Nobody but the bookmakers knew what it meant to sit all day, writing on the yellow parchment. The words below were written by a monk at the end of one beautiful parchment book :

Look out for your fingers !
Do not put them on my writing !
You do not know what it is to write !
It cramps your back, it clouds your eyes,
It breaks your sides and stomach !

Can you see the monk as he bent over his work hours and hours at a time? Scratch, scratch, scratch, went his pen made from goose quills. First, he looked at the page of the book that was his copy. Then he wrote on the clean page of parchment on the desk before him. Every letter must be made just right! No word must be left out! No changes must be made on the page!



Reproduced from a picture made by the monk Jean Mielot in a book made in 1456

A BUSY SCRIBE

Do you see the scribe's three ink pots beside him? Up on the wall are his paint pots. His double eye glasses and extra pens are on a shelf above him. There is a weight hanging over the parchment in front of him. The weight keeps the parchment steady while he works. In his left hand is the scribe's ruling knife.

Scratch, scratch, scratch, went the pen as the monk finished one page and turned to the next. He loved to sit there working on his book. The picture above was made by one of these scribes in a parchment book long ago. Can you imagine how the monk loved

to start a new page. He loved to make the beautiful letter with which he began the first word.

Scratch! Scratch! Scratch! He was almost done now. There was only a little more to write. He counted the pages and found that there was enough copy left to last him only three more weeks.

"I can finish by Christmas, if I hurry," he thought. "Only three more weeks! Then my beautiful book will be ready for all the Christmas guests to see and admire."

Scratch! Scratch! Scratch! His pen worked busily on. There was no time to lose. The monk had been working on the book for almost a year. But now he knew it would be finished by Christmas. It did not seem such a long time, now that the end was in sight.

"I will tell everyone to treat my book with respect," he thought, with a smile. "Dirty fingers? Ah, if people only knew how hard it is to make a book, they would never soil or tear one." Then he wrote:

Look out for your fingers!
Do not put them on my writing!
If you but knew the ache
That has gone into this book,
You would kiss this page in tenderness.

Bookmaking by Hand. I. Perhaps in a library or a museum in your town or county there is one of the old books made by the monks. Find out whether there is. If there is, plan to go to see the book. Notice the parchment pages. Notice the letters drawn by hand. Notice the beautiful letters that begin some of the pages. Notice the pictures. Talk about the book in class when you get back.

II. Pretend you are a monk in a monastery working in a copying room. Make a page as you think he made his pages. Can you describe the page you would like to make? Can you make it? Would you be willing to take as much time as the monks took doing their work?

III. Make some pictures that will tell the story of handmade books as you have read it in this book. Show the Egyptians making books; the Babylonians; the Chinese; the monks in the monasteries.

IV. Would you like to plan to make a book by hand in class for the school library? The book could tell the story of writing or of bookmaking.

To find out how to make a book, read *Let's Make a Book* by Harriet H. Shoen. This little book will tell you how to do each step. If you do each step carefully, the book will be strong and neat and beautiful. If you cannot get Miss Shoen's book, ask your teacher to tell you how to make your book.

But first you must write your book. Decide upon the chapters you are going to have. Write the chapters. Make pictures for your book. You will have to divide the work so that everyone can help in some way. In that way nobody will get as tired as did the old monk you have just read about.

A NEW WAY OF WRITING

For centuries and centuries books were made by hand. Slow copying by the Egyptian and Babylonian scribes! Slow copying by the Greek and Roman slaves! Slow copying by the monks in the monasteries! Only the Chinese had better ways of making books; and they hid their secrets carefully from the rest of the world.

But the time came when people in Europe grew interested in reading again. They wanted more books. They wanted to learn, to be educated. They wanted to find out about all the things they did not understand. They could not read the books in the monasteries. There were not enough hand-made books to satisfy all who wanted to read. Then, too, they were too expensive to buy. There should be books for everyone.

How could such a thing be done? It was nonsense even to think of it. People might want more books, but they would have to be satisfied without them. Only rich people could ever have books, they thought.

But you remember that the Chinese had been printing cards and pictures and books for many years. At last, the people of Europe found out how the Chinese did this. Then they began to print, too.

At first the Europeans printed only pictures. Then they began to print titles for the pictures. Later they began to print verses to go with them. Then the time came when whole pages of writing were carved on the wooden blocks. When the printed pages were put together to make a book, they were called *block books*.

At last, a German named Johannes Gutenberg began to print with movable type. This was a great step forward in printing. He carved his letters on little blocks of wood. Later, he found that metal letters, or *type*, lasted longer and made clearer print. He found an easy way to make metal type, too. His printers picked up the little metal letters and arranged them into words and sentences much more quickly than a monk could copy a page. The first book to be printed with movable type in Europe was probably the Bible, which was printed by Johannes Gutenberg in 1456.

Gutenberg had learned how to make type which could be used over and over again. It was no longer necessary to carve a whole page of writing upon a wooden block. It was no longer necessary to sit all day copying books with a pen. Books could be printed — thousands of them, enough for all the people of Europe to read.

After this invention the number of books grew greater and greater. Other inventions followed. Better ways of making type were found. Instead of arranging the type into words and sentences by hand, men found ways of setting type by machine. Faster and better printing presses were made. Today we have presses that can print thousands of pages an hour.

The invention of printing made a new world. Hundreds of copies of books could be made almost as easily as one. People began to read. Schools and colleges were started. Libraries were built. People began to get new ideas and learn new ways of living. Groups of people living long distances apart could know about one another — how they did their work, what they were thinking, what they were doing. The more people knew about how other people were living, the more they changed their own ways of living. The invention of printing made one of the greatest changes the world has ever known.

Europe Catches Up with China. You remember that China knew how to print long before the people of Europe did. After many years Europe found out how this work was done. Write the story of how Europe learned to print. The book *The Story of Books*, by Marjorie Maxwell, will help you.

How Printing Changed the World. I. Explain how printing made a new world. What were some of the changes that took place? The book *The World We Live In and How It Came to Be* by Gertrude Hartman, will tell you more about these changes. Look in the Table of Contents for the story "The World Learns to Read."

II. In what ways would your life be different if there were no printing presses in the world today? Would you be going to the same kind of school you go to now? Would we know as many things as we know today? Why?

PAPERMAKING TODAY

The invention of the printing press made wonderful changes in the world. But these changes could not have been made if men had not learned to make cheap paper. Men could not make thousands of books until they had something cheap to print on. They did not have cheap paper until they learned how to make it by machine instead of by hand, as the Chinese did.

Most of the paper today is made from wood. The spruce tree has the best wood for making paper, but the pine, the hemlock, and other kinds of trees are also used.

Different kinds of paper are made in different ways. The pictures on the pages following page 409 will show how one kind of paper is made.

Much of the wood used in making paper grows in the great northern spruce forests where the snow lies deep upon the ground during the long, cold winters! They are huge forests covering thousands of acres of land! They are lonely forests where nobody lives! They are still, silent forests in which the buzz buzz of the saws, and the crashing thunder of the falling trees may be heard only a few weeks each year!

Each winter, during the fourteen to sixteen weeks that there is snow on the ground, lumbermen go to these forests to cut trees for pulp. Three or four hundred lumbermen live in a logging camp.

Two men work together to cut down each tree. Back and forth, back and forth, they pull the sharp blade of the saw. They never stop until the saw has cut its way through the thick tree trunk. Then the men cut away the branches and limbs, and saw the tree into shorter logs.

The pictures on the next two pages show you what these lumbermen look like.

Credit note: The photographs in this series, with the exceptions of those on page 413, and the lower half of pages 414 and 421, are reproduced through the courtesy of Margaret Bourke-White and the magazine *Fortune*. The U. S. Forest Service supplied the print on the upper half of page 413. The Canadian National Railways supplied those on the lower half of pages 413 and 414. The photograph on the lower half of page 421 comes from Times Wide World.





When the logs are cut, they are dragged out of the woods to the roadway by horses, as you see in the picture at the top of the opposite page. The driver must guide his team carefully among the fallen trees, the dead logs, the stumps, and the live trees. In and out, around stumps, over logs, through narrow passages, go the horses. The driver calls this "snaking" out the logs.

Another driver with his team gathers the logs from along the roadway and carries them to the river or the railroad tracks.

Sometimes the logs are carried to the paper mill by train. The lower picture on the opposite page shows a log train.

When you turn the page, you will see a picture of the logs piled at the river's edge. The loggers pile them in high banks. Every log is carefully measured, and the size of it written in a little book. The logs wait here until spring. When the ice in the river has melted, the logs can be floated to the mills.

Often the river gets jammed with logs. Then the loggers poke and pull, and move them about, as you see in the lower picture, until they are headed downstream. The loggers use long poles with spikes at the end to push the logs about.





When the logs reach the mill, they are piled in neat piles twenty to twenty-five feet high, outside the mill. In the mill, the logs are first washed and the bark removed.

Next the logs are placed in a machine which cuts them into small pieces. In a short time there is nothing left of a log but tiny chips and sawdust.

After the wood is in chips, it is ready to be cooked for about twelve hours in big steel containers. Water and other materials are cooked with the wood. Cooking makes the wood into a soft pulp.

The wood pulp is washed and bleached, or made white. Then it is put into great tubs called beaters. Dyes are added to make the paper whatever color is wanted. Other materials are added to keep ink from running. The pulp is beaten to make it smooth, and to mix all the materials thoroughly. The beaters have strong paddles which make the pulp into a smooth mass.

The next four pictures tell you the story that you have read on this page. Find and study these pictures: (1) the huge wood pile outside the mill; (2) the machine that washes the logs and takes off the bark; (3) the pile of sawdust and chips which are made from the logs; (4) the chips after they are cooked into wood pulp.







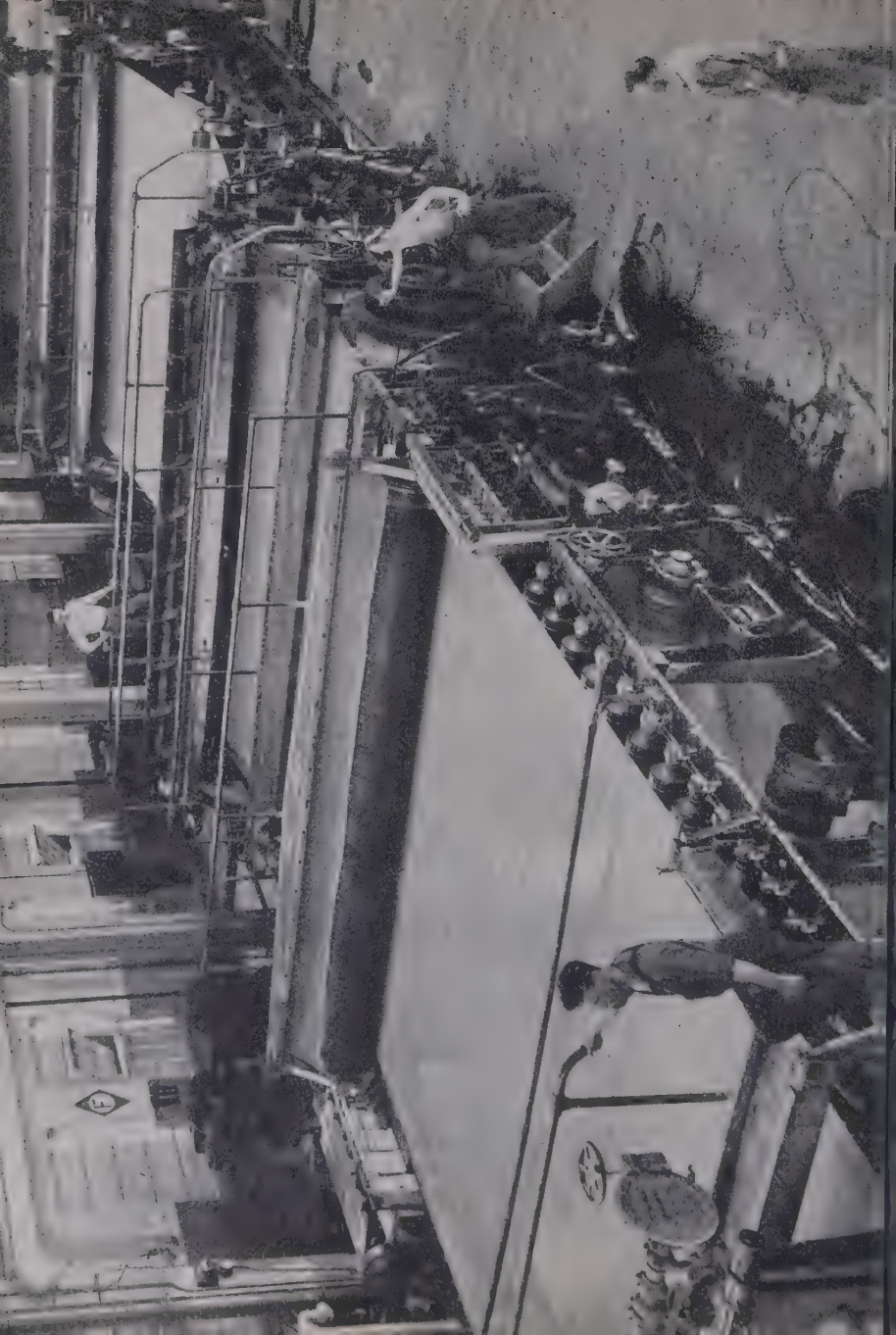
After the wood pulp has been cooked and beaten, it is carefully washed. Now it is ready to go on the papermaking machine. By this time so much water has been added to the pulp that it looks almost like pure water. The pulp is spread very thin and even on a fine wire net. Some of the water drips through the holes in the net. This part of the papermaking machine is called the "wet end."

As the wood pulp travels swiftly along the huge papermaking machine, all sorts of things happen to it. It passes over boxes which draw out the water. It is dried over hot pipes. It is rolled and rolled. This finishes drying it and makes it smooth. It mats the fibers closely together. At last the paper is wound in big reels.

Sometimes the paper is unwound and passed through another machine which gives it a shiny surface or a colored coating. But with many kinds of paper this is not done.

The finished rolls of paper are often sent to a newspaper plant, ready for printing the newspaper.

Read the story of this page in the next three pictures. Find (1) the thin pulp spread out on the fine net at the "wet end" of the papermaking machine; (2) the thin sheets passing over the rollers at the "dry end" of the machine; (3) the rolls of paper.





OUR PAPER SUPPLY

Tens and tons of paper are used every day. The newspapers are printed on it. Songs and pictures are printed on it. You use paper for writing letters and for your school work. Magazines and books are printed on paper. Paper is used on the walls of houses. Food comes wrapped in paper.

Thousands of acres of forests are cut each year to furnish us with paper. Few things could happen to us that would be more serious than having our supply of paper give out. Think how it would change our ways of living! Think how it would change the civilization of the world!

Since the earliest days men have gone on cutting down our trees. They are still cutting. They have cut trees to get rid of them. They have cut trees to make ships. They have cut trees to make houses. They have cut trees to make paper. They have cut trees to make telephone poles and furniture and boxes. Much of this wood has been well used, but some of it has been cut and then wasted.

There is another way in which wood has been wasted — forest fires. Each year great forest fires sweep through some of the woodlands of the United States of America. On they spread, burning, burning, burning! Miles and miles of forests are burned.

The fires leave behind them nothing but blackened stumps and half-burned trees. Such a waste this is!

People interested in forests have been working for some time to save our trees. They have tried to protect the forests from fire. They have tried to keep men from wasting the wood. They have tried to get owners of forests to replant trees.

The people of America are finally learning that forests are valuable. They should last forever as they do in most of the European countries. So people are planting trees — acres and acres and acres of young trees that will in time grow into big trees.

The government is helping this work of replanting the forests. It sends men into the woods to work. They are taught how to care for trees. They are taught how to fight fire. They are taught how to dig up trees from one place and plant them in another. They are taught how to doctor trees so as to make them healthy and strong.

Each year we should go on planting more trees. We should plant acres and acres of them. We should plant trees on all the land which is too steep or too poor for farming. Then this land will become valuable. Later, when we need to do so, we can go to these new forests to get wood for paper and for other uses.

Making Paper. I. Find on the map in your geography the forest lands from which we get much of the wood that makes our paper. Does our government own these forests?

II. Make a list of the steps it takes to turn wood in a forest into the paper we use.

III. Choose one of the steps in papermaking and be ready to explain just how it is done.

IV. Explain why the invention of printing would not have been important before the invention of paper.

Saving Our Paper Supply. I. Why do we use so much paper today? Is it necessary? What are some of the ways in which we waste paper? Make a list of them.

II. To whom do the forests belong? Do you think anyone has a right to destroy them? Explain some of the things we are doing to make our forests last longer.

MAKING BOOKS TODAY

If you were to go to a large city library, you would see rows and rows of shelves of books. Every year publishing companies print hundreds and hundreds of new books. How do we make books today?

We print most of our books, today, on paper. Very little of the work is done by hand, for there are huge machines for making books just as there are for making newspapers.

The pictures on the next few pages will tell you many things about how books are made today.



G. A. Douglas from Gendreau

SETTING TYPE BY HAND

Setting type by machine has already been shown on page 339. But some books are still set by hand. The man in the picture above is setting type by hand. You see the case of type. The type case is divided into little boxes, in each of which are small metal letters. Each letter of the alphabet has its place in the type case. Periods and commas are there, too. The man takes the letters from the case. He places the letters in the type holder, or "stick." This stick is the same width as the page of the book he is making. For that reason he knows just how many letters he needs in his stick to make a line of type.

When the man has finished his work, the type is put in "galleys." A galley looks like a long metal tray. It holds the type firm and even.

The galleys, whether they are made up by hand or machine, are placed on a hand press for "proving." A roller coated with ink passes over the type. A long strip of proving paper is pressed against the inked type. This print of each galley is called a "galley proof." Books are first printed on these long galleys so that mistakes can be easily corrected before the book is printed.

Copies of galley proof are sent to the proofreader in the printing house. Some copies are sent to the editor at the publishing house. Some are sent to the author of the book. Usually there are many mistakes in each galley proof. When the galley proofs have been read and the mistakes marked with signs which are understood by the printer, they are returned to the printing house.

A man who sets type by hand takes each galley of type and its corrected galley proof and looks at them together. He picks out the incorrect type from the galley of type and puts in correct type. A new proof is made. When the mistakes are corrected, the type in the galleys is separated into pages. More proof is made from the pages and read.

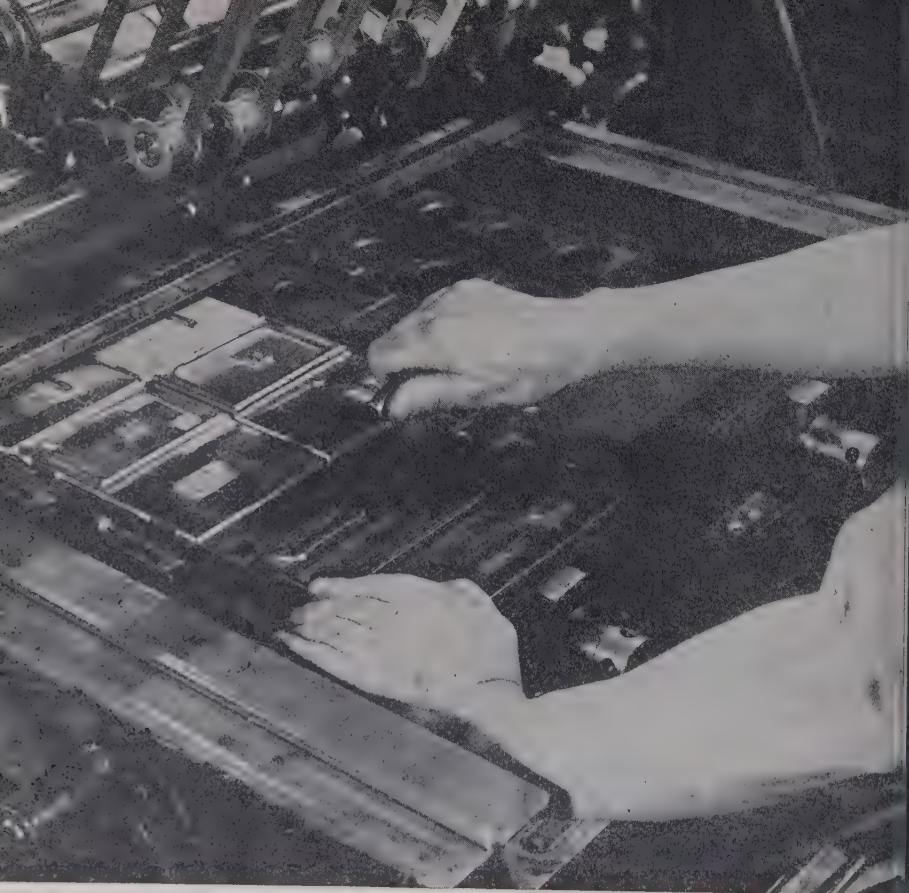


G. A. Douglas from Gendreau

LOCKING UP THE TYPE PAGE

Then the type pages are fastened tight in a metal frame. The man in the picture above is getting a type page ready to be locked in one of these metal frames.

When the type pages are all locked up in frames, they are sent to the foundry. There a metal plate

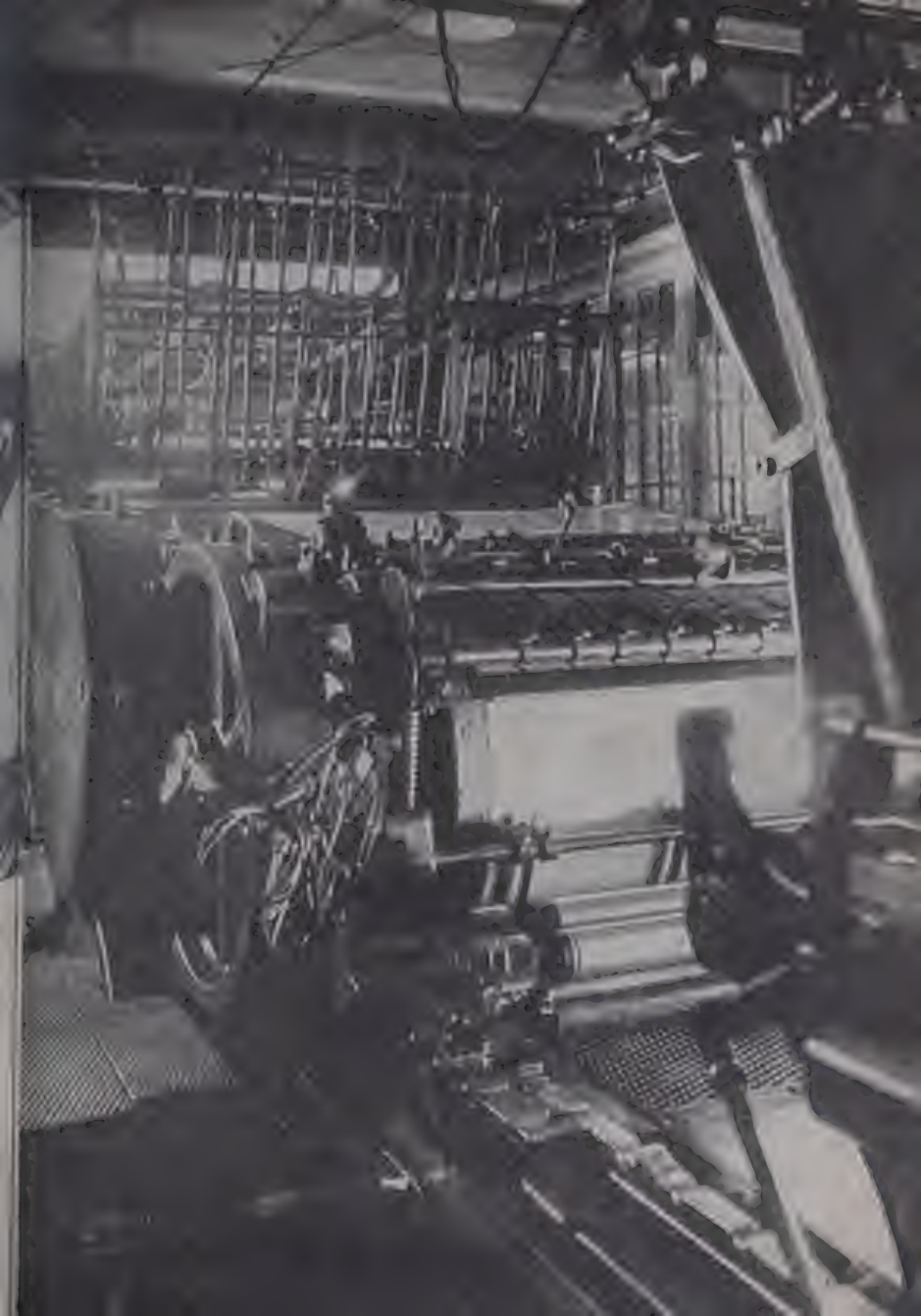


G. A. Douglas from Gendreau

PLATES ON THE PRINTING PRESS

is made for each type page. In the picture above, you can see several metal plates. They are being locked up on the printing press. On the opposite page you can see another part of one of the great printing presses which print our books today.

Credit note: Pictures on pages 429 and 432 are reproduced through courtesy of Haddon Craftsmen.



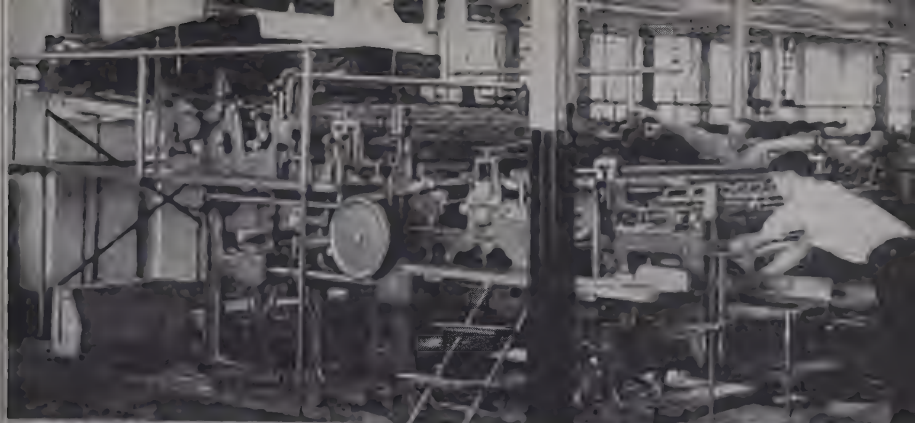
Great rollers spread the thick black ink evenly over the plates. Sheet after sheet of paper passes over the plates and is covered with printing. The paper moves with a steady click, click, click. The rollers of ink move round and round.

When enough copies of those pages have been made, the plates are changed. Other pages are printed the same way.

As the sheets of paper leave the press they are piled in big stacks. Then they are folded. This is done by the machine shown at the top of the opposite page. Each large sheet of paper is folded in exactly the same place. First it is creased, then folded in one direction. Then it is creased and folded in another direction. Four times, or eight times, it is folded. This folding brings the pages in the right order. Each large sheet of printed matter makes sixteen, or thirty-two, or sixty-four pages of a book.

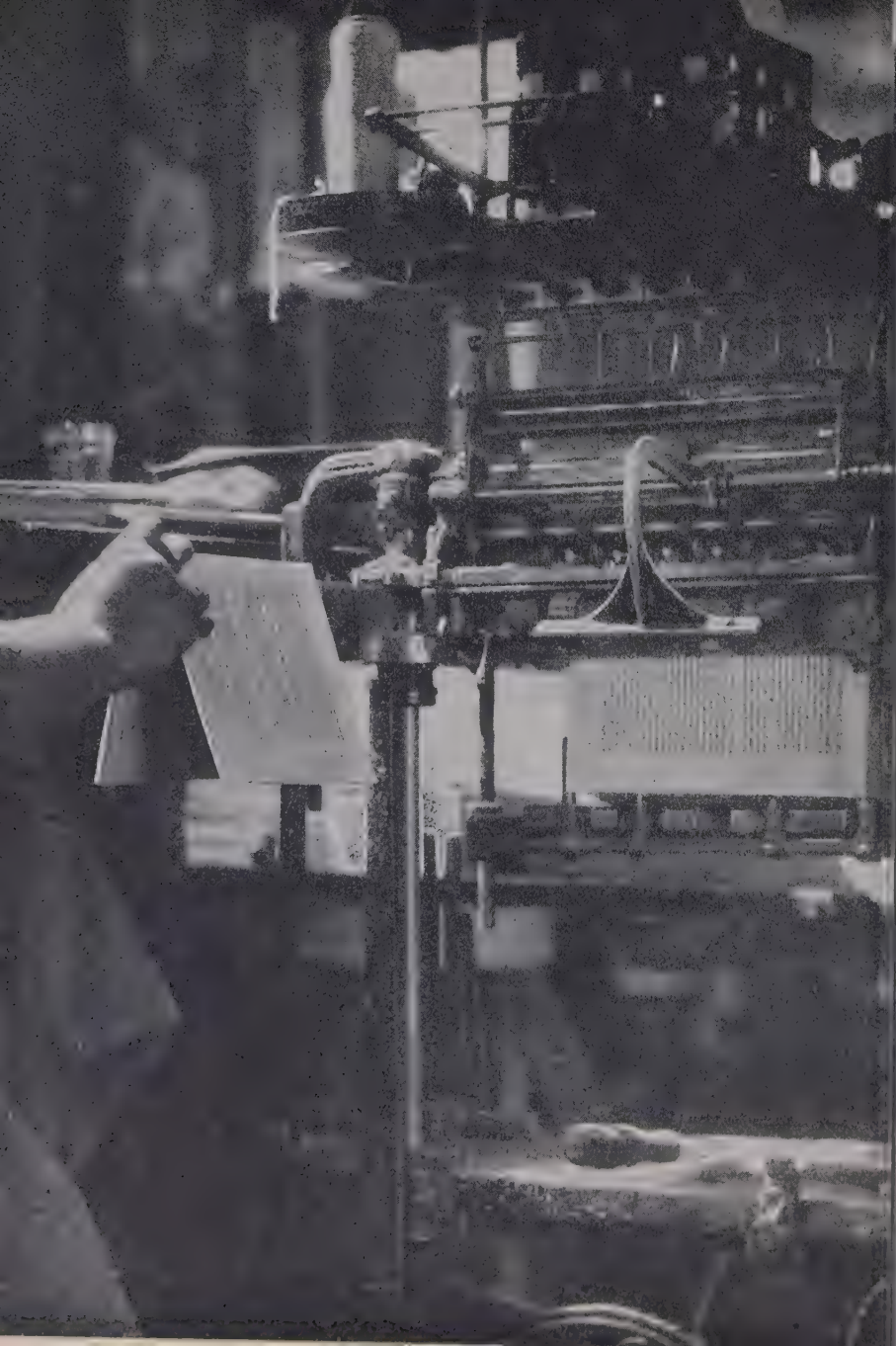
The next steps are trimming and binding. The machine shown on the lower part of the opposite page trims the pages to make them even. A great knife cuts through thick paper as easily as a table knife slices butter.

The books are ready now for the bindery. A sewing machine in the bindery is shown on the next page. Last of all the covers are added.



Courtesy Braunworth and Company

FOLDING AND TRIMMING MACHINES



How Books Are Made. I. Choose one of the pictures about bookmaking given in this book. Make a list of all the things that one picture tells you about bookmaking.

II. Which step in bookmaking do you think is the most interesting? Which machine would you like to run?

III. Why are there many, many books printed today? Do we need so many? In what way do we use books?

What Is in a Book. I. Examine one of your books. Then answer these questions about the book:

1. On which page do you find the name of the book?
2. On which page do you find the name of the author? (Sometimes there is more than one name because there is more than one author.)
3. Where is the Table of Contents? What does the Table of Contents tell?
4. Where is the Index, if there is one? What does the Index tell?

II. Compare the book you examined with the books your classmates examined. If you have been examining different books, find the answers to these questions:

1. Are all of the books the same size? Are the pages the same size? Do the books have the same number of pages?
2. Do all books use the same size of print? Or is the print in some books larger than in others?
3. Do all books use the same kinds of illustrations?

How to Care for Books. What are some of the things that you can do to keep your books from wearing out and from looking less attractive? Think of five things and then put them into a list as rules.

THINKING BACK

The questions on this page will give you some things to think about. Talk them over together.

- I. Which part of this whole story about writing did you most enjoy? Why did you like that part best?
- II. Would it have made any difference in the way people lived if they had known how to make paper and how to print earlier than they did?
- III. Little children in America learn to read and write in the first grade. But in Egypt and China and Babylonia even the grown men and women could not all read and write. Why was this true?
- IV. It has been only in the last few years that books have become so cheap that almost anyone who can read can have books to read. What has made books cheaper?
- V. Can you think of anything more important than the invention of a way of writing? Give reasons for your answers.
- VI. Many different people have helped us in learning how to write, how to make paper, and how to print. Make a list showing the people who have helped us the most.
- VII. All children are expected to learn to read and write. Why is it important for them to do so?

A PRONOUNCING LIST OF PROPER NAMES

The names in this list are marked to show how they are pronounced. You know that the accent mark tells you which syllable to say the hardest. There are marks over some of the letters to show how the letters sound. This table of letter sounds will show you what the marks over the vowels mean.

ă as in âte
 ă as in ât
 â as in câr
 â as in pâss

ē as in ē
 ě as in lět
 ě as in owněr
 ě as in ěvent

ō as in hōpe
 ǒ as in hǒp
 ô as in ôr
 oō as in fōōd

ī as in hīde
 ĭ as in hĭd

ū as in ūse
 ŭ as in ŭs

û as in tûrn

Africa (ăf'rĭ-kă)	Canada (kăn'ă-dă)
America (ă-mĕr'ĭ-kă)	Central America
Amsterdam (ăm'stĕr-dăm)	(sĕn'trăl ă-mĕr'ĭ-kă)
Arctic Ocean (ărk'tĭk ō'shăn)	Ceylon (sĕ-lŏn')
Asia (ă'zhă)	Chicago (shĭ-kô'gō)
Atlantic Ocean (ăt-lăn'tĭk ō'shăn)	China (chĭ'nă)
Australia (ô-s-trăl'yă)	Chinese (chĭ-nĕz')
Babylonia (băb-ĭ-lŏ'nĭ-ă)	Cretans (krĕ'tănz)
Babylonians (băb-ĭ-lŏ'nĭ-ănz)	Crete (krĕt)
Black Sea (blăk sĕ)	Cyprus (sĭ'prŭs)
Boston (bôs'tŭn)	Danube River (dăn'ŭb rĭv'ēr)
Brazil (bră-zĭl')	Dutch (dŭch)
Britain (brĭt'ĕn)	Egypt (ĕ'jĭpt)
Calcutta (kăl-kŭt'ă)	Egyptians (ĕ-jĭp'shănz)

England (ɪŋ'ɡlænd)	Norway (nôr'wā)
English (ɪŋ'ɡlɪʃ)	Nova Scotia (nō'vā skō'shā)
Ethiopia (ē-thī-ō'pī-ā)	Palestine (pāl'ēs-tīn)
Euphrates River (ū-frā'tēz rīv'ēr)	Panama Canal (pān-ā-mā'kā-nā)
Europe (ū'rūp)	Pergamum (pûr'gā-mŭm)
France (frāns)	Persia (pûr'zhā)
French (frēnch)	Philadelphia (fil-ā-dēl'fī-ā)
Germans (jûr'mānz)	Phoenicia (fē-nīsh'ī-ā)
Great Britain (grāt brīt'ən)	Phoenicians (fē-nīsh'ānz)
Greece (grēs)	Red Sea (rēd sē)
Greeks (grēkz)	Rio de Janeiro (rē'ō dā zhā-nā'rō)
Halifax (hāl'f-fāks)	Romans (rō'mānz)
Hebrews (hē'brōōz)	Rome (rōm)
Holland (hōl'ānd)	Russia (rŭsh'ā)
Hongkong (hōŋ'kōŋg)	Sahara Desert (sā-hā'rā dēz'ērt)
India (in'dī-ā)	San Francisco (sān frān-sīs'kō)
Indian Ocean (in'dī-ān)	Seattle (sē-āt'l)
Indus River (in'dūs)	Seir (sē'ir)
Ireland (īr'lānd)	Seirites (sē'ir-itz)
Japan (jā-pān')	Sidon (sī'dōn)
Japanese (jāp-ā-nēz')	Sinai (sī'nī)
Knossos (nōs'ūs)	Spain (spān)
Lebanon Mountains	Suez Canal (sōō-ēz' kā-nāl')
(lēb'ā-nōn moun'tīnz)	Syria (sīr'ī-ā)
Mediterranean Sea	Thebes (thēbz)
(mēd-ī-tē-rā'nē-ān sē)	Tigris River (tī'grīs rīv'ēr)
Memphis (mēm'fīs)	Tyre (tīr)
New York (nū yōrk)	United States (ū-nīt'ēd stātz)
Nile River (nīl rīv'ēr)	Virgin Islands (vēr'jīn ī'lāndz)
Nineveh (nīn'ē-vē)	Yangtze River (yāŋ'tsē' rīv'ēr)
North American	Yellow River (yēl'ō rīv'ēr)
(nōth ā-mēr'ī-kān)	Yokohama (yō'kō-hā'mā)
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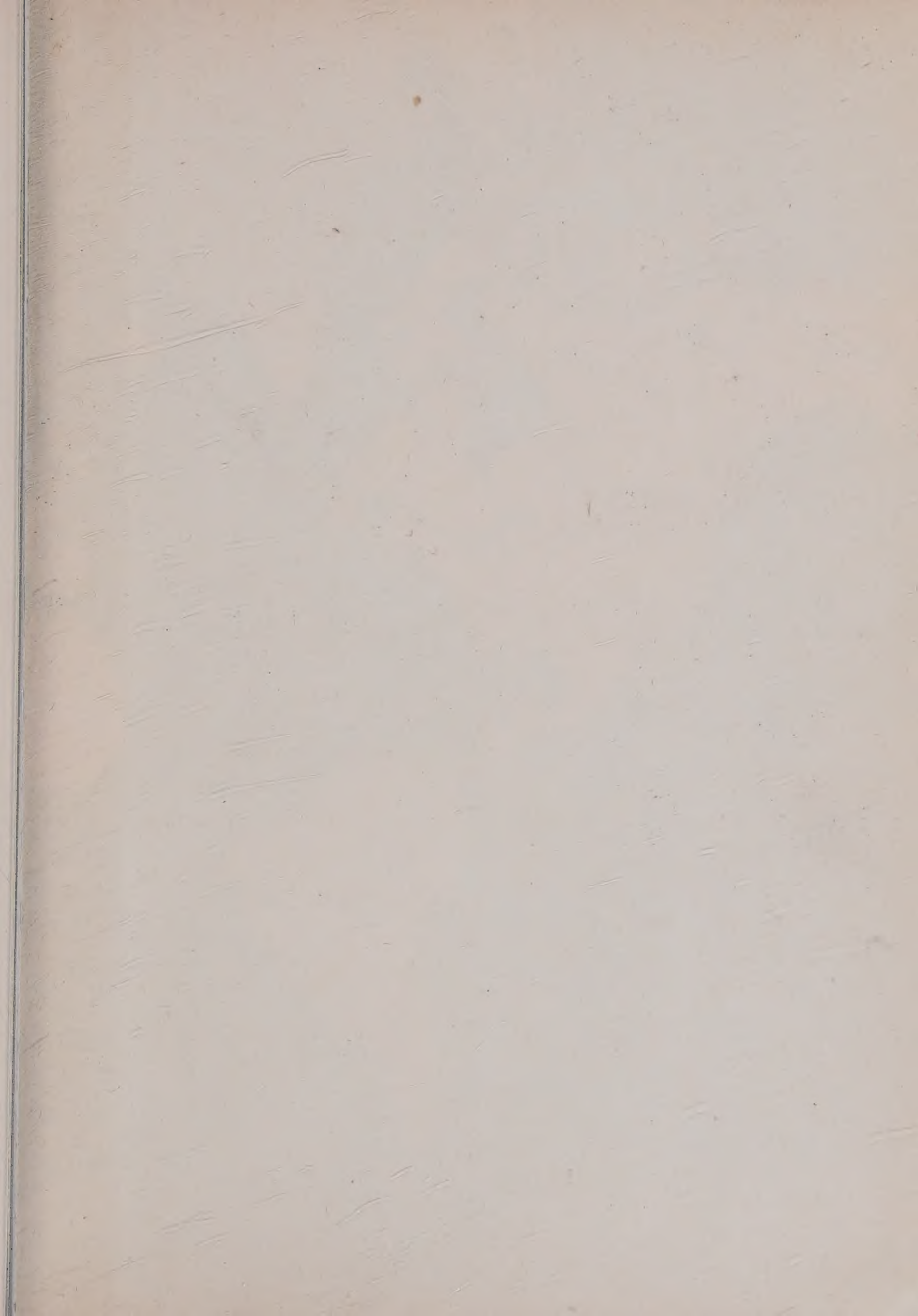
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